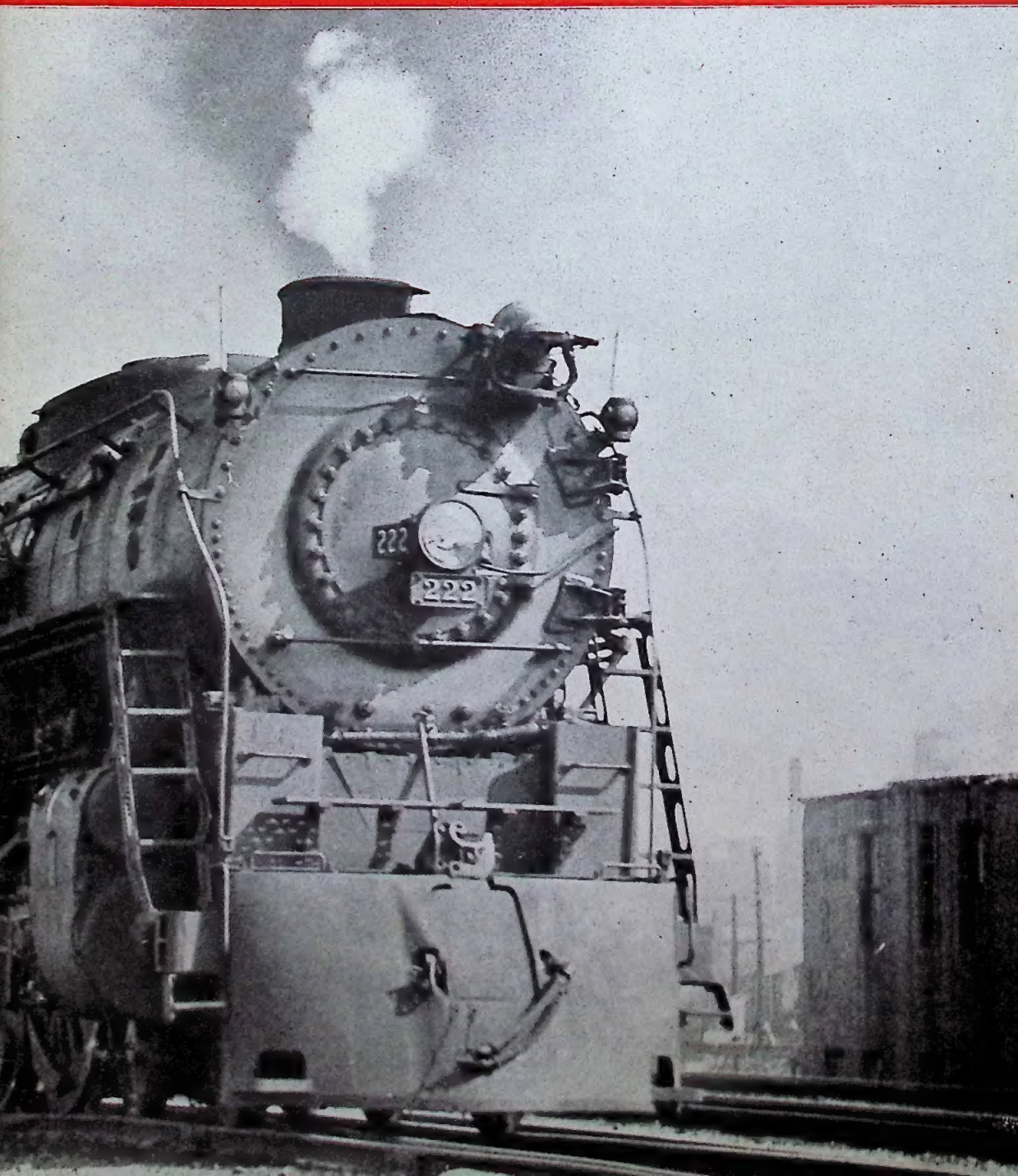
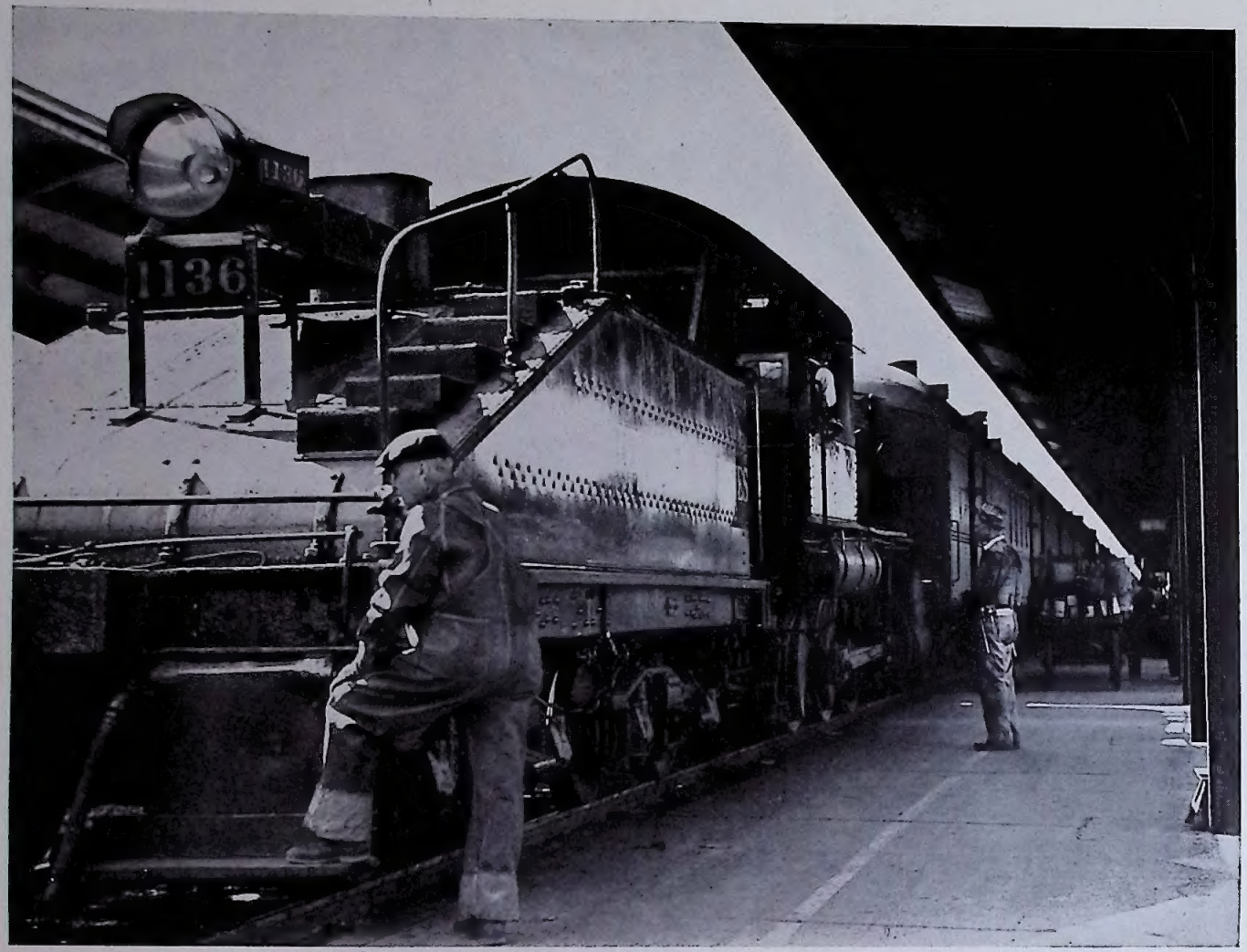
Trains

25¢

for MARCH *1943*





Henry Flannery.

Ogden station.

Like subway trains during rush hour, the transcontinental limiteds roll through the Union Station at Ogden in early evening. Starting with the *Pony Express* at 7:40, there is an eastbound Union Pacific train leaving every 10 minutes until the *Challenger* at 8:20. The Southern Pacific switcher in the photo is moving a cut of mail cars under the Ogden umbrella sheds.

Waybills

The railroad as a mover of supplies and equipment is necessary to modern war. It stays in the background, while airplanes and trucks get most of the publicity, but the part the railroad plays can be well understood from the fact that a modern transport plane and a modern locomotive have roughly the same horsepower. Yet the plane will do well to haul 10 tons of cargo, while the locomotive can pull 1000 net tons even on bad track, and 5000 or more tons on well maintained level main track. Keep this in mind when you hear discussions of the part the airplane will play in revolutionizing transport after the war. The railroad will still do the mass hauling, and at a cost of less than one cent per ton-mile, far below the most optimistic estimates of plane cost. The railroad uses energy only to move freight—not to keep it in the air.

Memories:

An after-hours dinner with a friendly dining-car steward on the *Capitol Limited*.

The big shed of the Montgomery (Ala.) station sheltering as assorted a lot of trains as I ever saw, including a bright GM&O gas-electric.

That man in the dining car on the next track, who sat across from me for mile after mile as the Grand Central train and the Hell Gate Bridge train raced side by side along the New Haven's four-track line east of New Rochelle.

The Mallet pushers used up the grade past my home 25 years ago.

A. C. K.

Trains

Editors: A. C. Kalmbach, Linn H. Westcott, Willard V. Anderson

Vol. 3 March, 1943 No. 5

Features

PENNSYLVANIA'S MOUNTAIN TYPES ---------- 4
Dual-service engines.

THE MAN IN THE TOWER ---------- 6
By Edward Hungerford.

GRAND CENTRAL ---------- 9
By A. C. Kalmbach.

VIA BURLINGTON—WARTIME FREIGHT ---------- 20
By Henry D. Rennwald.

CAR RETARDERS ---------- 25
How they work.

PICTORIAL PRESENTATIONS:
B&M transfer point ---------- 26
SP in the Siskyous ---------- 28
Old New York & Harlem locomotive ---------- 30
World's sharpest curve, NYNH&H ---------- 29
Western Pacific; Norfolk & Western ---------- 31

LUMBER RAILROAD ---------- 32
By Jim Morley.

RAILROAD UPS AND DOWNS ---------- 43
More business, less profit.

THEY LOOK ALIKE ---------- 44
By Arthur Curran.

also Letters, News, and Miscellany.

Masthead photo, by H. C. R. Landon, Lenox School, Lenox, Mass., is of the NYNH&H *Bankers' Express* about 1912.

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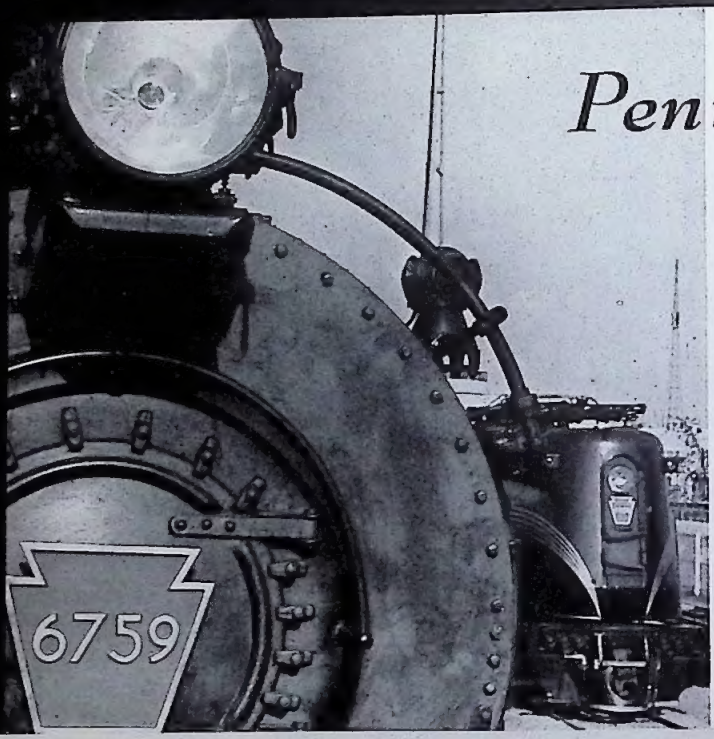


Pennsylvania's Mountain Types

At left is M-1a locomotive 6759 photographed at the New York World's Fair. To the rear is a GG-1. Below is an M-1 near Pittsburgh with train LCL-1, westbound from the New York-Philadelphia area, which every night, with its eastbound twin LCL-2, carries a million and a half dollars' worth of merchandise. M-1 6853, lower right, was photographed at Canton, O.

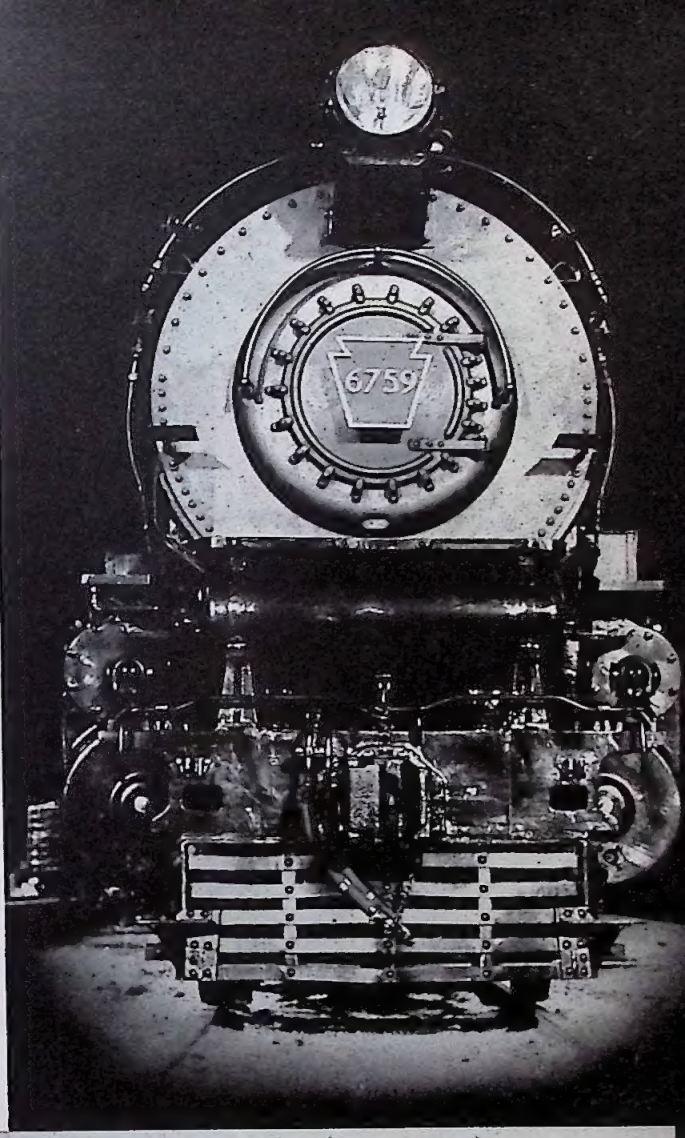
Left, H. F. Harvey, 650 Olean St., Worcester, Mass.; below, courtesy Pennsylvania Railroad.

DURING the bleak years of the early thirties the Pennsylvania Railroad toyed not at all with new steam locomotives of the 4-6-4 and 4-8-4 types which were then becoming popular. It didn't have to.

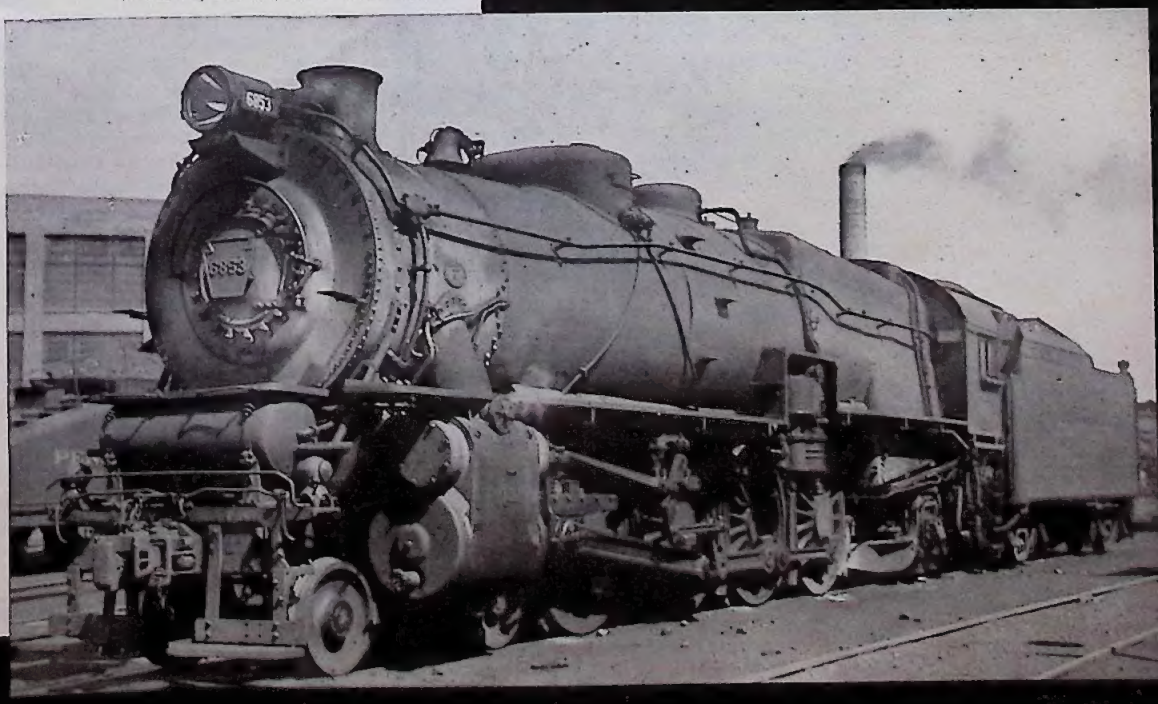
The Pennsylvania was not only well fixed with steam power because its Eastern electrification had released hundreds of modern locomotives which could be moved west, but because just before the crash the road had purchased 301 Mountain (4-8-2) type locomotives well suited to both heavy fast passenger and fast freight service.

The first of these were the 200 class M-1 engines built in 1926 following one experimental 4-8-2 built in 1923. While Pennsy locomotives are not generally numbered in series, these fall in the 6800 and 6900 groups. The photos below well illustrate the appearance characteristic of the M-1. As originally built they had average-size tenders like the one on the right, but later these were replaced with long-distance tenders like that at the left. The long-distance tender was a feature of the M-1a's as originally built.

The 100 M-1a's fall in the 6700 series and were built in 1930. They are an improvement on the M-1's in various details, but are the same in most essential dimensions. Both carry 250 pounds of steam, have grate area of 69.9 square feet, 27" x 30" cylinders, and 72" drivers.



Right, Robert A. LeMassena, 398 N. Maple Ave., East Orange, N. J.; Below, G. G. Grabill Jr., Box 238, Canal Winchester, O.



The Man in the Tower

BY EDWARD HUNGERFORD.

To a constant traveler it is interesting to notice the changes that the war already is working in the trains, not alone in crowded stations and still more crowded coaches and Pullmans—situations regarded as inevitable in a war emergency of this magnitude—but in the smaller details as well. Take, for instance, the employment of young women in the ticket booths. Why this was not done long ago is a railroad puzzle. The inflexible seniority rules of railroad employment apparently have worked too much toward the retention of grumpy old gentlemen in the ticket wickets of the stations. The airline people long ago learned that the employment of attractive young women in their ticket offices was a selling force of real magnitude.

Apparently, the railroads are now learning the same lesson—a bit tardily; for in the great stations in New York, in Philadelphia, in Washington, in Chicago, elsewhere, the young woman ticket-seller finally has made her appearance, neatly uniformed and fully as attractive as any WAAC or WAVE. She contributes much to the bright side of the war. The big roads added ticket windows aplenty, which, because of limited physical facilities, are generally limited to the exclusive sale of coach tickets, for which there is the greatest demand anyway. Obviously, it takes a lot less training for a girl to sell a simple coach ticket than it does to sell a complicated interline one with Pullman reservations and sales. It takes an old hand, and a skilled one, to make out one of these correctly, and then, correctly, to compute its cost—quickly, with the thought in one's head that any errors in computation are to be taken out of the next pay-check.

There are other wartime changes to be seen along the line. The traditional dining car, for most of the Eastern roads at least, has consisted of six four-seated tables on one side of the aisle, and six two-seaters on the other. This gives at least a modicum of elbow room to us larger gentry. Because of the war, the dining car is yielding to interline bus treatment. New and narrower chairs are being secured, and new and larger tables, with the result that now there are four-seaters on both sides of the slightly narrowed aisle, and the standard diner seats 48 passengers instead of 36 at a time. This makes a lot of difference when one considers that it may become necessary to serve from 200 to 300 passengers for a single meal.

The wonder is that, with such an emergency right at hand, the roads have not done more to simplify their dining-car service. Already they are taking steps to this end. On a number of roads the long list of a-la-carte dishes has disappeared, with a brief note that, "whenever possible," the steward will arrange them if requested. This is a move in the right direction—long overdue. The real wonder is that, long ago in the piping days of peace, the roads had not already begun to simplify their dining-car menus. A cramped dining-car kitchen is never well adapted to a-la-carte or short-order service of the restaurant type. Not only does it slow work in the kitchen vastly, but it has a most decided tendency to slow the patrons.

Long ago the continental railroads of Europe adopted the simple plan of serving a simple dinner, or table d'hote, at certain set hours during the day. As soon as a through train was well under way from its starting point, a dining-car steward passed through and distributed reservation tickets to passengers desiring them. These guaranteed your seat at a definite serving of the regular meal. It might be the first service, or the second, or the third, or even the fourth, but it was a definite service, and of precisely the same bountiful meal. Your reservation ticket showed the exact hour at which you were expected in the dining car, as well as your seating place. . . . Seated, the actual serving of the meal went along in orderly and well planned fashion. One or possibly two waiters passed through the car with the soup course . . . then the fish or entree . . . then the roast, with its accompanying vegetables . . . the salad . . . the dessert . . . the coffee (for which, in Europe, a slight additional charge always is made). In addition to these, there was always an extremely bustling waiter whose job it was to serve the wines; a check on his sales was kept by the chief steward, who carefully collected the corks and the money for the wine.

A simple system, but it always has worked, and worked extremely well. There are no passengers standing in the aisles awaiting meals. But our American roads would hear nothing of it. It was difficult to induce some of them to introduce a table d'hote in any form. The Pennsylvania experimented for a while with it on the *Congressional Limited*, but later dropped it.

The answer was, of course, the competition between the roads. Competition led them to many wasteful service excesses, which reached their height in the dining-car excesses. One railroad president once boasted to me that he had lost more money on his dining cars the preceding month than ever before in the history of the road. That meant that he had carried more people than ever before in a single month. . . . The Milwaukee Road, in the days of the immortal Dan Healey, lost a reputed $60,000 a year on the dining car that he commanded each evening from Chicago to Milwaukee on the *Pioneer Limited*. But how it upbuilded the *Pioneer Limited*! Not another train on any road between Chicago and the Twin Cities could even touch it for business.

With shining examples like these set in front of them, no wonder the passenger traffic managers of the larger roads went a little crazy, that Uncle Dan Willard went out, himself, to buy corn meal and country sausage for Baltimore & Ohio breakfasts . . . that President Wallace Atterbury of the Pennsylvania introduced hors d'oeuvres on his road that you hardly could

equal in a Philadelphia restaurant . . . that Santa Fe took Fred Harvey out of the Harvey Houses and made a dining-car service deluxe . . . that the Northern Pacific raved over its "great big baked potato" and the Union Pacific over its $2 steak dinner (Omaha-bred) that could not be matched on dry land for twice that figure.

Yet it all was wrong, economically, and no one knew that better than the railroads themselves. However, with the competitive system ruling across the land, they felt themselves helpless. It takes a supreme crisis like a war to throw off things of this sort, after which they generally return again anyway.

ALL in all, nearly 800 lounge, observation, club and parlor cars lately have been transformed either into day coaches or into sleeping cars designed primarily for troop use. It is estimated that some 35,000 additional coach seats have been gained by this transformation. In addition to this, the Pennsylvania Railroad is converting a number of its automobile box cars into temporary day coaches, seating 78 passengers each and entirely suitable for short runs. The Pennsylvania has gone further and is experimenting with redoing some of the fine steel cars of extra height into three-tiered sleepers for possible troop train use.

Pullman also is experimenting with three-tiered sleepers. Two of these, with crosswise berths fully as comfortable as those of its standard sleeping cars, have been used experimentally on the *Pacemaker* and the *Trail Blazer* between New York and Chicago, where they were warmly received. Fifty more are now being constructed, with still another fifty in the offing. Designed primarily for troop train services, at the end of the war they will form, unquestionably, a most popular vehicle for low-priced rail travel. With their rates at less than half that of the standard Pullmans, they will be a welcome addition to many of the already popular "all-coach" trains, all the way across the land.

In addition to all of this, Pullman has sold 141 club cars, 47 observation cars and 314 parlor cars to the roads upon which they formerly operated. Most of these are being made into day coaches and go to swell that total of 35,000 new day-coach seats, in a day when no new day coaches may be constructed. A few of them still will be operated as parlor cars by their owner roads. It would be hard to imagine the *Merchants' Limited* or the *Congressional Limited* without parlor cars in the consist. Or the *Empire State* or the *Twilight*. The East is rather conservative about these things. Parlor cars are part of its tradition, and it is hard for the East to forego its traditions.

Edward Hungerford

Kaufman & Fabry, Chi

Not only are the railroads turning to womanpower behind their ticket counters, they are modernizing the ticket booths themselves. This windowless counter in the Pennsylvania Railroad's LaSalle Street ticket office in Chicago is in charge of Miss Charlotte B. Garvin.

Courtesy New York Central System.

Most beautiful room in the world.

The concourse of Grand Central Terminal, New York Central and New Haven station in New York City, is generally rated as one of the most beautiful rooms in the world, and train travelers will no doubt give it the exclusive title. New York Central ticket windows are at the left in the photo and another similar row of windows for New Haven tickets is out of the photo to the left. The entrances to train platforms are out of the photo to the right. Beneath this main concourse is the suburban concourse, about the same size but with a low ceiling.

★ NYC's New York terminal set a new record by handling 51,044,587 passengers in 1942.

Grand Central

By A. C. Kalmbach.

To millions of Americans who have never seen New York City, Grand Central Terminal is the embodiment of all the glitter and bustle that is Manhattan. To New Yorkers it is a utility; yet it is their very own railroad station, the one terminal on Manhattan which has grown up with the island. It is to New York the symbol of the far-flung New York Central System.

Seen from 42nd Street, the terminal is likely to be a disappointment to the bumpkin who gazes upon it for the first time. True, it looks just like the pictures. But it is dwarfed by skyscraper hotels and office buildings, and its magnificent show does not become really apparent until one gets inside. Then comes the first breathless view of the beautiful concourse and a gasp of amazement at the crowds coming and going, not via 42nd Street after all, but through numerous subterranean passages connecting with subways, hotels, and office buildings.

Most of these people give hardly a glance at the massive square columns, the perfectly proportioned vaulted ceiling, or the sunlight streaming down from the high south windows. They are on their way, in a railroad station, and all the architecture, all the impressiveness, are but an incident to the engineering marvel that is the real Grand Central, an engineering marvel mostly beneath ground and out of sight of all but the most inquiring passengers.

The real Grand Central is the layout of 67 stub tracks, the loops for turning trains, the storage tracks, and the throat tracks over which flows a traffic which ranks Grand Central with Pennsylvania Station in New York, South Station in Boston, Union Station in St. Louis, and Waterloo Station in London as the busiest in the world. It is over these tracks that trains of the New York Central and New Haven railroads last year handled 51,044,587 passengers, 23.3 per cent more than in 1941, without straining the facilities engineered back in the early years of the century. In 1902, when Grand Central Terminal was being conceived, the passengers in old Grand Central Station, used by the same two roads, totaled 15,557,421. In the new terminal 209,272 passengers have been handled in a single day, December 24, 1942. The terminal was indeed planned for the future, and on a titanic scale.

That so much railroad capacity could be crowded into one stub-end station as compact as Grand Central is a credit to William J. Wilgus, one-time chief engineer of the New York Central, who developed the un-

Radio version.

"Grand Central Station" it is in the radio script, although Grand Central Terminal is obviously the purported scene of this popular program. But any Grand Central habitue' would be very, very surprised to hear a steam locomotive pull up to one of the arrival platforms, whistle tooting and steam working right up to the last turn of the drivers! Naturally the radio sound effects have to be more in accord with the average man's idea of a railroad station than with the real, rather tame, sounds of electrified Grand Central.

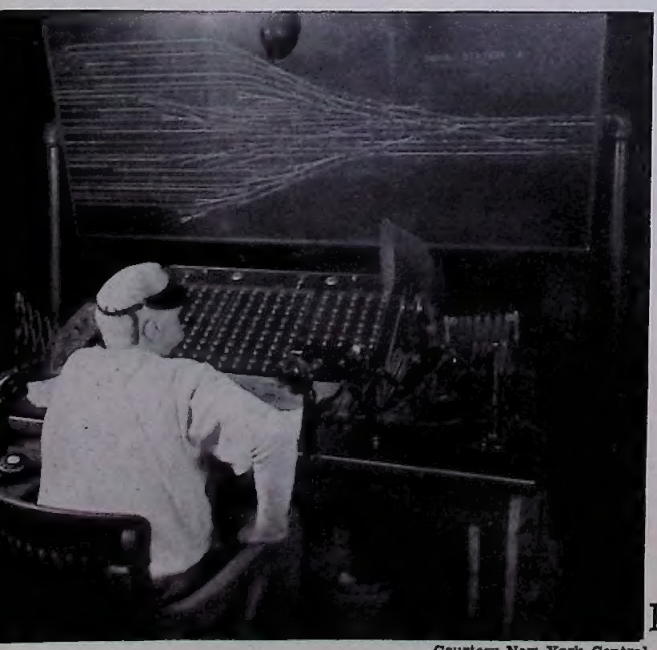
precedented plan of building the train shed in two layers. This was made possible only by using electricity for traction power, an innovation which up to that time had been tried for steam railroads only on the B&O's Baltimore tunnels and one or two relatively small projects.

Perhaps 59 platform tracks could be concentrated on a single level behind one headhouse. But even were a concourse of this length practical, Grand Central rests upon some of the most valuable real estate in the world, about 48 acres of it! As it is, the concourse, one of the most beautiful rooms in the world, is also one of the largest, 272 feet long, 125 feet high, and 120 feet wide. The old New York city hall could be placed within it without crowding. And in spite of all this stupendous length, passengers may find themselves arriving far to the west of the concourse, beneath the Biltmore Hotel, or leaving far to the east under the Commodore.

The terminal itself is a city in miniature, housing within its walls a motion picture theater, an art gallery, several restaurants, and numerous shops in which may be purchased most of the staple necessities of life and many of the luxuries. Some of the larger hotels, such as the Commodore, Biltmore, and Roosevelt, have direct entrance into the terminal so that travelers may go from the trains to their hotel quarters without passing through the streets, a convenience much appreciated on stormy days.

The main station building faces south on 42nd Street, one of the wide, important cross-town streets of Manhattan, and is 722 feet long, 395 feet wide and 165 feet high at the street level. Below the street level it is 745 feet long and 550 feet wide. The floor space of the station can accommodate 30,000 people in the concourses and waiting rooms.

The tracks run north from the terminal under one of the finest New York streets,



Courtesy New York Central.

The center of Grand Central.

Grand Central as an operating unit centers not about the concourse, nor the ticket windows nor the information booth, but about this diagram and desk in Tower A. This is the train director's desk from which he controls all operations on the upper level. The director does not actually move the levers which work the switches and signals, but at his desk figures out the movements needed and then passes the directions on to levermen who set up the routes through the maze of switches. At right is a map of Manhattan showing the New York Central lines fanning out from Grand Central, as well as other railroad lines serving the island. The old line which ran far downtown below Grand Central is also indicated. Some New York landmarks help to place locations to those unfamiliar with New York. Until the Pennsylvania Railroad built tunnels under the North (Hudson) and East rivers in the early 1900's, the New York Central was the only company that owned tracks connecting Manhattan with the nation's railroad system. All other lines used ferries for their connections just as CNJ, Erie, West Shore (NYC), and Lackawanna do today.

Linn H. Westcott.

Park Avenue, and leave the island at its north end. While the terminal building looks small, it is eight stories high, but behind a facade designed to look like a single floor. Three huge, beautifully proportioned windows take up most of the south front. Fourth Avenue from the south comes to an abrupt stop immediately under the center window, but its traffic is carried over 42nd Street on a bridge and then splits, skirting two sides of the terminal on elevated roadways which then tunnel through the 35-story New York Central Building and emerge at street-level, at 46th Street, to become Park Avenue.

It is below this striking Park Avenue, below the 35-story New York Central skyscraper, below other important buildings, a church, hotels, and clubs, that the railroad is built, a bewildering array of tracks and switches laid in a cavern carved from rock and roofed with steel and concrete. Four tracks come down the tunnel under Park Avenue, and at 57th Street start to fan into the wide, gloomy spaces filled with red and yellow signal lights, gleaming rails, and rugged columns. The tracks spread not only east and west, but downward. Two inclines, one of 2.7 per cent grade for upward trains and one of 3.0 per cent for downgrade trains, descend into real depths of the lower level.

Centraliana.

Although dwarfed by its surroundings, the terminal building is very large. Around it goes the upper level of Park Avenue (called Fourth Avenue south of the station), while northward the avenue is built directly above the tracks (left center). This picture was taken before the New York Central Building was built at end of the rows of buildings. The scene below was taken from almost the same viewpoint just after the old terminal had been partially electrified. Steam locomotives were still in use. Upper right, the old station as the architect visualized it, and the famous clothes lines, upper Park Avenue, as seen from New Haven's *Yankee Clipper*, north of the tunnels.

The upper track level is for through trains. The entrance to its platforms is directly from the main concourse. But beneath this main concourse is another of about the same size, but with a low ceiling. This is for suburban passengers, and along its north wall are the entrances to the low-level suburban platforms. Thus the two types of traffic are separated, and the station area is used most efficiently.

The upper level has, of course, its large waiting room, nearly the size of the concourse. And the lower level has its restaurant and lunch room with the famous oyster bar. Both have the necessary ticket windows, divided into groups for the New York Central and the New Haven. Both levels have baggage and parcel checking facilities and both have information booths in the centers of their concourses. Twenty-two newsstands

Center, courtesy General Electric Co.; others, New York Central.

Courtesy New York Central.

F. B. Gleason Jr., 315 E. 68th St., New York City

are strategically located to enable the quick purchase of magazines or newspapers. In addition, there are six bootblack stands, six cigar stores, two barber shops, a ladies' hairdressing parlor, a theater ticket booth, a liquor store, two book shops, two drug stores, a print shop, a clothes-weaving shop, a haberdashery shop, a jewelry shop, a cutlery shop, a candy shop, and many others.

With all these conveniences and with the direct entrances to three neighboring hotels, it is possible to live in Grand Central Terminal and its adjacent buildings for almost any period of time without suffering the loss of any of the conveniences possessed by persons who utilize the whole city's resources.

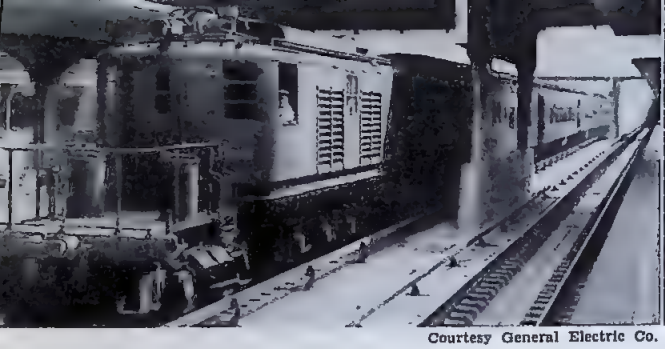
Though the tracks of the upper level are 20 feet below street level and the suburban tracks are 24 feet farther down, no one need use stairs to reach the various levels. An ingenious system of ramps at comfortable slopes connects the street level, subway entrances, waiting room, concourse, and the platforms. The platforms themselves are at car-floor level, four feet above the railhead. Until the time Grand Central was built, this type of platform had been almost universal in England but very little used in this country except for rapid transit service. Pennsylvania Station in New York was built about the same time and also with high platforms. In both cases they aid in faster car loading.

In addition to the platform tracks the station layout includes stub storage tracks, so that the upper level has a total of 41 tracks and the lower level 26 tracks. As originally designed, the station layout included somewhat fewer platform tracks, and, because of shorter platforms, much additional storage capacity out beyond the sloping lead tracks over which trains ran to the platform tracks. But trains grew longer and longer and the platforms were lengthened out into what had at first been storage space.

For the most part, the westernmost tracks on each level are used for arriving trains. On each level are loops of track running from these westernmost arrival tracks around the south end of the terminal and back into the parallel trackage at the east side of the layout. Thus arriving trains can be turned directly and pulled away to the coach yards, or, in the case of the multiple-unit suburban trains, given a quick cleaning and run right out again on the suburban departure tracks at the east side of the loop.

These loops are a unique feature of the terminal design. South Station at Boston had loop tracks for suburban trains provided in its design, but these were never put in operation. The Hudson & Manhattan tube terminal is a loop layout, as is also the San Francisco Bay Bridge terminal, but both these are rapid transit types of railroad. The suburban level loops in Grand Central well proved their worth in the Summer of 1919 when a subway strike diverted a huge and sudden traffic to NYC local trains. In one day more than 181,000 passengers were moved, and most of them were utterly unaccustomed to using railroad suburban service, thus adding to the congestion. Extra trains were run around the loops in almost rapid transit fashion and the crowd was moved with an average train delay of only a fraction over two minutes. But the loop for the turning of through trains was even more of a departure, so much so, in fact, that it was not completed and put into operation until May 21, 1927, 14 years after the terminal's opening.

An integral part of the operating scheme of any great terminal is its coach yard, where



Courtesy General Electric Co.

Courtesy New York Central.

cars are serviced, cleaned, and made up into trains. For Grand Central this coach yard is at Mott Haven, five miles north of the terminal at the point where the main line and the Harlem Division divide. When Grand Central was built it was hoped that the station storage facilities would be sufficient to concentrate most car servicing and switching in the terminal itself and thus eliminate the necessity for empty train movements between the terminal and Mott Haven. But the everlasting growth of traffic was too much for these plans, and the car yards continue to be out where real estate values are lower. Only a limited number of suburban cars are stored on the lower level.

In between Mott Haven and Grand Central is a four-track stretch of line which ranks as busiest four-track road in the world. Over it run all New York Central and most New Haven trains into and out of the terminal, as well as all empty train movements to and from Mott Haven yards. These empty train movements amount to about 20 per cent of regular trains. During the one hour between 5 and 6 in the afternoon, 56 regularly scheduled trains go in and out of the terminal. At this time three of the four tracks are devoted to handling the outbound traffic, while between 8 and 9 in the morning three tracks are given over to inbound traffic. This is made possible by a modern signaling system which permits any of the four tracks to be used in either direction. The signal blocks are short, but the signals give four-block indications and thus trains can run on close headway with perfect safety.

A modern electric interlocking, Tower MO, controls the intricate trackage at Mott Haven. Not only do the main lines diverge here, but there is a wye track, and across this wye and into the crotch of the mainline junction run the lead tracks for Mott Haven coach yard. Tower MO can so aline the switches as to put incoming trains onto any one of the four throat tracks leading down the crucial five miles to Grand Central, and it can take trains for any one of these tracks and place them on the correct outgoing mainline tracks. A full set of crossovers at 106th Street, where Tower NK spans all four tracks, also allows changing trains from track to track, and likewise the tower at the terminal throat, 57th Street, has full flexibility. These towers are all interconnected by a loud-speaking telephone system, so that with efficient informality and yet with absolute safety trains can be routed around each other to make full use of every section of track.

Inside the terminal area itself, pinned down by giant supporting girders of the Waldorf-Astoria, is a four-story signal tower with two operating levels, one for the through-train track level and one for the suburban level. One would hardly call this a tower, and yet tower it is, underground but sticking up through the two layers of trackage and carrying all the usual railroad signaling paraphernalia, relay rooms, power supply, track diagrams, and the long rows of interlocked levers to control switches and signals. Here is the real heart of Grand Central. In Tower A, upper level, five men are constantly at

Courtesy New York Central.

All aboard.

Left, before the roof covered all the platforms of Grand Central, pictures like this could be taken of flyers about to wind their way up the Hudson. This is how the *Century* looked years ago. North of the old station trains went through Park Avenue Tunnel, cut partly in solid rock from 49th Street to 106th Street. The south end of the tunnel no longer sees daylight and the north end is now at 96th Street as seen here.

work setting up routes through the rows of switches for the arriving and departing through trains. Tower B, below, does the same thing for suburban trains. The tower director must be ever on the alert for deviations from regular schedule. If all trains ran the same number of cars day after day and came on time, schedules could be worked out for lining up the tracks. But a train may one day have extra cars or extra sections and so not fit its customary berth. Then the tower director must hurriedly work out a means of placing it as close to its usual platform as practical. Or a train may arrive late and crowd upon the time of another train customarily assigned to the same track. All these problems are figured out anew every few minutes down there under the Waldorf-Astoria in Towers A and B. Back in the heart of the station building itself, in a room which might pass for an office and quite out of sight of trains and track, is another unusual signaling "tower" controlling the loop tracks.

The signal units themselves are of the searchlight type, and at the usual block signals along the main line between the terminal and Mott Haven two units are used, one above the other, to give the indications for four blocks ahead. At interlockings three units are used on each mast. With signals for both directions on all four tracks, the red, green, and yellow lights present a very colorful spectacle at night to the rider on the rear end of a train.

The electrical power for train operation is distributed by means of an under-running third rail, protected by wood on top for the safety of employees. Power is 600 volts direct current. A higher voltage on overhead trolley was not used both because of limited clearances in the tunnels and because of New York ordinances prohibiting high voltage overhead conductors. The New Haven differed with the New York Central on choice of power and distribution method for its mainline electrification and chose 11,000-volt alternating current with overhead trolley. In order to bring New Haven locomotives and multiple-unit cars into the terminal from Wakefield, where the New Haven joins the NYC's Harlem Division, the New Haven electric equipment was fitted with third-rail shoes and with control equipment to permit use of either type of current. It is interesting to note that the New Haven later gained entrance to the Pennsylvania Station via Hell Gate Bridge and for many years used the

Passenger locomotive.

Electric locomotives operating passenger trains between Grand Central and Harmon, N. Y., are of several classes, but this one is most frequently used on the through trains. Built by General Electric and Alco, these 139-ton, 600-volt locomotives are powered by eight GE-91-A motors, with a one-hour blown rating of 311 horsepower; drawbar pull at 25 per cent adhesion, 69,450 pounds; maximum speed, 75 miles per hour.

$200 in prizes.

More than $200 in cash will be awarded the writers of the best manuscripts about the railroads of any region submitted in TRAINS' competition (first announced last month), which closes at midnight May 2. Every reader of this announcement is invited to participate subject to the rules of the contest, reprinted below:

1. The awards will be: First award, $100; second award, $50; third award, $25; and as many additional awards of $15 each as the judges deem worthy.
2. Manuscripts, entitled "The Railroads of _____ [any state or other geographical region]," are to be from 3000 to 8000 words, exclusive of pictures, picture captions, lists and map data.
3. Manuscripts must be typewritten on 8½" x 11" unlined paper and double spaced. Use only one side of the paper.
4. Manuscripts will be judged on completeness and accuracy of information, literary style, organization of material, photographic illustrations and supplemental material which will assist in interesting presentation of the article. Entries submitted without accompanying photographs will be given full consideration.
5. All entries earning cash awards will become the property of Kalmbach Publishing Co. Valuable photographs, maps, etc., receiving awards will be returned only after use and if specifically requested. Return postage should be included in every case. The publisher cannot be responsible for safe return of entries.
6. Entries must be addressed: Competition Editor, TRAINS Magazine, 1027 N. 7th Street, Milwaukee, Wis. Do not include with your entry subscription orders or any correspondence not pertaining to the competition.
7. All entries must be postmarked by midnight, May 2, 1943. Every attempt will be made to announce winners in the July, 1943, issue of TRAINS.
8. Employees of the Kalmbach Publishing Co. and their families are not eligible.
9. Judges: Editors of TRAINS and Dean Jerry O'Sullivan, School of Journalism, Marquette University.

Courtesy New York Central.

same dual-power arrangement there, with over- instead of under-running third-rail. But when the huge Pennsylvania mainline electrification was pushed to completion the Pennsy became another advocate of high-voltage A. C. power, and now New Haven trains use 11,000 volts straight through on the Hell Gate Bridge route but change power when running to Grand Central.

THE Grand Central Terminal is not only a remarkable transportation instrument, but the center of a great civic development. The air rights over the railroad tracks and yards were used beyond all precedent, and the income from these air-rights leases goes far toward paying the fixed charges on the terminal. At the same time this development has helped to increase the importance of the terminal from the transportation standpoint, for, more and more, Grand Central becomes the hub of an extremely important section of New York City.

This was not so back in 1869, when Commodore Cornelius Vanderbilt chose the site for the first Grand Central "depot." Then 42nd Street was far uptown. But it was one of the wide crosstown streets in the city plan, and the commodore, with his usual prescience, foresaw the day when New York would cover the whole of Manhattan Island and 42nd Street would be at the commercial center of gravity. Indeed, the commodore's very choice of location did much to bring this about. Perhaps, had that original Grand Central been located elsewhere, Times Square, only a few blocks west on 42nd Street, would not today be so important.

The first Grand Central was a wonder of its day. Commodore Vanderbilt had just consolidated the New York Central with his Hudson River Railroad. He also owned the New York & Harlem, over which the New Haven entered New York City. None of these roads had terminals worthy of the metropolis. The Harlem and the New Haven shared a building down at 26th Street which later became the first Madison Square Garden. The Hudson River used a small-town depot down at Chambers Street and West Broadway. The Harlem Road had the better entrance to Manhattan, coming as it did

Mott Haven is part of the terminal.

Originally Grand Central Terminal was laid out to provide for turning trains and car storage on the spot, but traffic increased so astoundingly fast that the tracks in the terminal building were relocated for larger trains. Now storage, and much of the train turning, is handled at Mott Haven Yard, located in the Bronx north of Harlem River (see map, page 11). The view of the coach yards is toward Manhattan, while the scenes at the right are in the wye at the south end where the yards, the NYC main and the Harlem Division all come together.

Top, NYC; bottom, General Electric Co.

down the length of the island parallel to Fifth and Madison avenues, which already had social prestige. So the commodore chose the location at 42nd Street on the Harlem line, built a connection between the Hudson River Road and the Harlem at Spuyten Duyvil, and when his magnificent new station was completed shifted all Hudson River trains, except a local connection, to the Harlem line. The old Hudson River Railroad entrance to New York, which has had no passenger service since World War I, is now the West Side freight line.

The new station, said the commodore, must be something pretentious, something worthy of New York's then-1,500,000 population. It was. The structure was designed by Isaac C. Buckout, superintendent and chief engineer of the New York & Harlem, a man who had designed many a smaller structure on the Vanderbilt railroad lines. Grand Central Depot, opened in 1871, was his masterpiece. The huge trainshed covered certainly the largest room in America and perhaps in the world, 600 feet long and 200 feet wide. Into this train shed came none of the smoke of locomotives, for Mr. Buckout had devised an ingenious system whereby the locomotives of incoming trains speeded up a distance before they reached the station switches and, after a running uncoupling, ran ahead of the trains and were switched off. The trains, under control of a brakeman, then coasted into the train shed. This system was used for many years with no mishaps.

Around the south and west sides of the train shed was built the station building itself. Unfortunately, this was divided into three separate sections, one for the New Haven along the 42nd Street front and two for the Harlem and for the Hudson River roads along the west front, on a new street which later was named Vanderbilt Avenue. Although the New Haven had the best frontage, the structure, like its successors, was owned and operated by the New York Central with the New Haven leasing rights to the station and its approaches.

The separation into three sections was one disadvantage the first Grand Central never overcame. But in spite of this the building was widely acclaimed and, in fact, Edward Hungerford is authority for the statement that it was held second only to the Capitol at Washington in national esteem. By modern-day architectural standards the building might be described as rambling and gingerbready, but by the standards of 1871, when it was opened, it was handsome with its red brick walls, its exterior trim of cast iron painted white to look like marble, and its slate roof.

The giant trainshed was a special source of wonder. The station master's office had a bay window high in the station wall at the south end of the shed, from which the station master could watch the comings and goings of his trains. An ingenious, for its time, system of electric bells gave warning

Mott Haven Yard.

when trains crossed the Harlem River five miles to the north. The running time from there to Grand Central was 20 minutes, supposedly time enough for the station master to clear the arrival track. Only passengers with tickets were admitted to the train shed, an arrangement new to the country.

As the year came and went the Grand Central Depot took its place as a fixture of the city. It came also to take more and more of the ever-growing suburban and through traffic built up between the expanding reaches of the New York Central System and the developing midtown New York. An annex was built along the east edge of the property, but it was not enough. Came 1898, and with the turn of the century the old depot was rebuilt and considerably enlarged. The three separate stations in one building were finally combined into one large workable terminal, with common waiting room and ticket facilities.

But even the remodeled depot was only a stopgap. Its huge waiting room and train shed were not enough for twentieth century New York. The big decision was made in 1902, the decision to build a modern terminal big enough and fine enough to serve New York in every way for many years to come and to fittingly represent the New York Central in its biggest city.

The work of demolishing the old Grand Central Depot began July 1, 1903, and on August 26 excavation started along the east edge of the property at Lexington Avenue, where some old buildings had been torn down. Generally speaking, construction work progressed from east to west across the site, with trains continuing to use the old depot until June 5, 1910, by which time the lower level of the new terminal and a partly completed upper level were taking care of the business. The big job was the blasting and removal of more than three million cubic yards of rock, most of which was carried out along the main line and used to widen the grade, particularly along the Hudson River.

At no time was service interrupted. The engineers figured so as always to have sufficient tracks in operation in either the old or new stations to take care of not only the regular business but the seasonal rushes as well. At the same time, electric operation was being established on the approaches and in the old station so that all service could be turned over to white coal by February 13, 1907. The only steam locomotives used in Grand Central after that date were those which pulled the cars of rock out from under the steam-shovel dippers.

The giant trainshed that had been the commodore's pride and joy disappeared. The deep hole for the new tracks was at its eastern edge. Trains were running under it. But the contractors built a giant traveler which they moved on tracks along the length of the shed, removing the steel work bit by bit while the traffic proceeded underneath.

When New York first saw Grand Central Terminal in its full massiveness and beauty there were many who believed, and said so frankly, that it had been constructed on a scale far too large for the traffic it handled. And they were right. But it was built not for 1913 alone (it was opened February 2, 1913), but for years to come, years like 1942, with more than double the traffic of 1913. The public now needs no convincing as to the foresight and vision of the men who sponsored Grand Central. Today it is acknowledged to be one of the most efficient and most beautiful terminals in the world.

Intermingled in the steady stream of humanity which flows through the terminal day and night are travelers of every age and rank, from every country and every continent. "Stand there long enough and you are almost sure to meet everybody you know." The terminal is a cross-section of humanity; its magnificent precincts are the stage on which are enacted every day most of the comedies and tragedies of human life. Here is a happy group going home for New Year's; there, a honeymoon party is followed through the gates by a bereaved family taking a

loved one to his last rest in his distant birthplace. In another part of the station a group of convicted criminals, most of them young, is entraining, under guard, for Ossining, there to pay in Sing Sing prison the penalty that society demands for their misdeeds. And so it goes, a kaleidoscopic, never-ending, ever-changing drama, with a sentimental, emotional, imaginative appeal that fascinates.

To take care of the thousands of travelers in and out of Grand Central Terminal, particularly on the long-distance trains, requires the services of 400 Red Caps, as the porters are called. These porters do not select their own posts, but are divided into groups, performing different tasks according to their age and service. The newest men remain on the lower level two weeks before being graduated to through trains. The older men meet the taxis at Vanderbilt Avenue and 42nd Street and the trained younger men service the through trains, as this job requires swift, alert service.

Each morning, just before the arrival of the *Twentieth Century Limited* or the *Commodore Vanderbilt,* both from Chicago, 30 to 50 porters line up inside the train gate under the eye of the chief of the Red Caps. Just before the train arrives they run down the platform and station themselves in groups at the door of each passenger car. The average Red Cap is 35, although some are as old as 67. Under their skillful eyes there is seldom lost even a single piece of baggage.

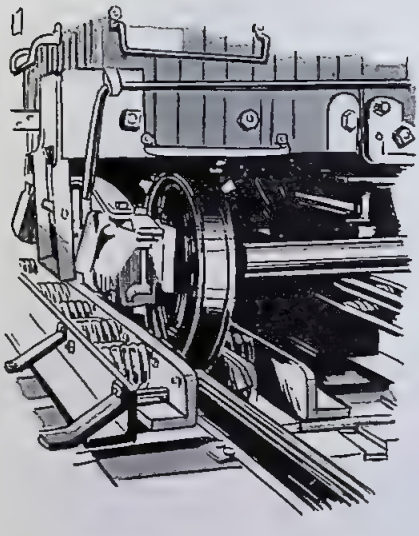
One of the most used services in the terminal is found in the three parcel rooms, two on the upper level and one on the lower level, where 60 men, employed in eight-hour shifts, keep travelers' belongings stored, but instantly available. Passengers arriving on incoming ships deposit their parcels or luggage in the package room while they go sightseeing. Morning commuters deposit in them until it is time to dress for the theater, perhaps in the dressing rooms which are provided at nominal rentals in the lower level. Occasionally, absent-minded people never return for their parcels. After 13 months these are presented to charitable institutions. Sometimes traveling men quit their jobs suddenly and let their bosses worry about the sample cases they have checked in the parcel rooms. This happens more often than one might expect, and when it does, every effort is made by the parcel-room forces to locate the manufacturer and return the sample case. The parcel rooms even receive laundry, returning it washed and ironed in 24 hours, a service frequently used by commuters.

The most modern and efficient system so far devised for receiving and answering questions over the telephone was placed in operation April 1, 1937, in the Information Bureau of Grand Central Terminal, when a completely new installation of telephone apparatus was completed after five months' work. This bureau, one of the busiest in the world, has answered as many as 15,400 queries in one day. This task required the services of 31 operators. On this record day the maximum was 1200 calls an hour, or 20 a minute. Normally, it is about half this number. The bureau works through a new order turret system, the first ever installed in a railroad terminal. Its operation is largely automatic, the information clerks receiving the calls without having to take time to throw keys as heretofore. One of its features is that if all the receiving operators are busy answering questions, the excess incoming calls are stored electrically in the order received and then answered in turn as fast as a clear wire becomes available.

Over the main entrance of the terminal may be seen these words: "To those who with head, heart and hand toiled in the construction of this monument to the public service, this is inscribed." In front of the center window on the south facade is a bronze statue of Commodore Vanderbilt, gazing down lower Park Avenue, his back solidly against a greater Grand Central than even he envisioned.

Next month:

Lawrence W. Sagle tells about the Baltimore Belt Railroad, by means of which the Baltimore & Ohio traverses the heart of Baltimore. This includes the tunnels and Baltimore electrification of the B&O. . . . Wayne Leeman, a new writer in TRAINS but well experienced in railroad reporting, describes the new Suchiate River bridge which connects Mexico with Guatemala.



Via Burlington —

Climb to the black cushions in the caboose of First 67 and witness some real train handling.

By Henry D. Rennwald.

The "Q" moves tonnage.

The Chicago, Burlington & Quincy shares in the vast movement of essential freight to the West Coast, as well as in the stepped-up tempo of shipping in every direction. With the Denver & Rio Grande Western and the Western Pacific, the "Q" forms a well established transcontinental route. On this route the new hump yard at Galesburg, Ill., with its car retarders (sketch above) is an important center. The Burlington 4-8-4 freight engine shown below (near Red Oak, Ia.) is the same one which pulled First 67 in the accompanying article.

On December 7, 1941, the railroads of the nation suddenly found themselves in the greatest demand since World War I. Immediately after the Jap attack on Pearl Harbor plunged the United States into the second World War, traffic men of the nation's carriers stripped off their coats and went to

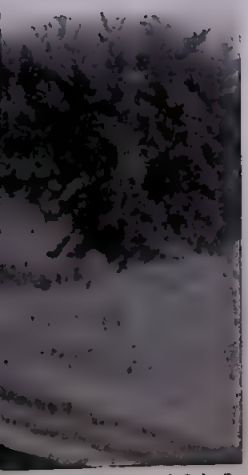
Wartime Freight

work. From that day to the present, railroad traffic increased tremendously, and the showing made by the roads amazed even operating men. But the traffic still increased, so inevitable bottlenecks were bound to show up on various systems.

Galesburg, Ill., is sometimes called "the heart of the Burlington System."* A glance at a map of the Chicago, Burlington & Quincy will show the reason for this. Practically all traffic, except direct Chicago and Minneapolis business, goes through Galesburg. The Burlington had one hump yard in operation there, but as business boomed it soon became evident in early Spring of 1942 that the yard would be unable to cope with the situation.

S. L. Fee, general superintendent of the Chicago, Burlington & Quincy Railroad, in charge of lines in Illinois, Wisconsin and Minnesota, commuted between his headquarters in Galesburg and Washington, D. C., presenting arguments before the War Production Board to build a new hump yard to speed traffic in all directions. After numerous appearances before the board, with his engineers, purchasing agents and other interested parties, permission finally was granted Fee to build the new yard. Construction began on June 6 and the yard was in full operation on November 18. Costing a million dollars, the new westbound hump gets freights through Galesburg from two to twenty hours faster than they formerly moved through the yards when flat switching was used.

* Galesburg is also the real name of the city called Dooner in Christopher Morley's *Kitty Foyle*. Mr. Morley, a lover of railroads, usually manages to bring a bit of railroad atmosphere into his stories.—*Ed.*]



Bernard Corbin, Red Oak, Ia.

Morton Park. Contributor unknown.

Let's follow a fast freight out of Chicago and see how the hump yard works.

On a foggy morning, engine 5617 whistles off and First 67 eases out of the yard at Morton Park, Ill., at 10:40. Soon she is out on the main line, pulling 48 cars of 1500 tons. At Eola, just east of Aurora, we pull into the yard again, and fill out our tonnage train. Arriving at 11:47 a.m., by 12:25 p.m. our train is complete and we pull out this time with 82 cars and 3800 tons.

At Earlville we're switched to the eastbound main and run against the current of traffic. After coaling up and taking water at Mendota, the 5617 begins rolling. As First 67 moves along at 45 miles an hour on the eastbound track, we're passed by First 39, the *Exposition Flyer*, en route to Denver and the Pacific Coast. We continue on the eastbound track until Princeton, when we again cross over to the westbound. At Buda we head into the passing track to allow Second 39 to whiz by, and then follow it into Galesburg.

Arriving at the yard limits, we switch off the main line and begin moving over the freight tracks toward the yards. Promptly at 5 o'clock the 5617 arrives at the top of the hump, cuts off, and goes back the running track to the roundhouse to be serviced for the trip to Omaha while the train is

being switched out. Now we see how the movement is speeded up.

As soon as the train comes to a stop, a messenger is waiting at the caboose to get the wheel report and way bills from Conductor Meyer. The messenger places them in a pneumatic tube for movement to the general yard office two miles away, where clerks sort the bills and look through them for diversions. While inspectors are going over the entire train, an operator in the office puts the list of the train on the teletype circuit, where it is transmitted simultaneously to the two switching towers.

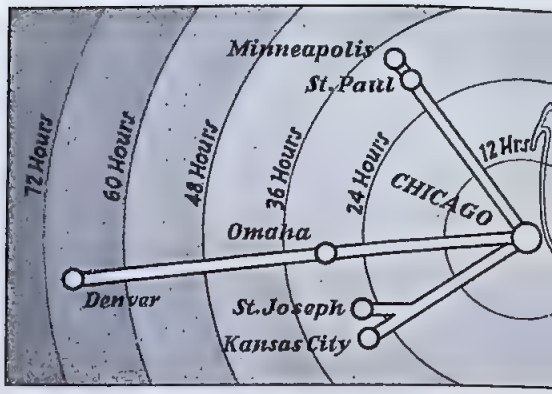
Up in the tower the teletype begins to click, and looking at it you see something like this:

67 Eng 5617 from Morton Park to Galesburg Ill
1 GN 567342 42 tons steel rails Denver
2 SP 43541 46 cement Ottumwa
3 Penn 64345 42 furniture Paducah
4 Q 34567 mty Galesburg
5 MKT 342178 48 machinery Cody Wyo

This jargon indicates the number of the car in the train, initial, car number, tonnage, consist, and destination. There are 35 tracks in use on the westbound hump, with, for example, track 45 for Denver, 44 for west of Denver, 43 for points west of Lincoln, 42 for Lincoln proper, etc.

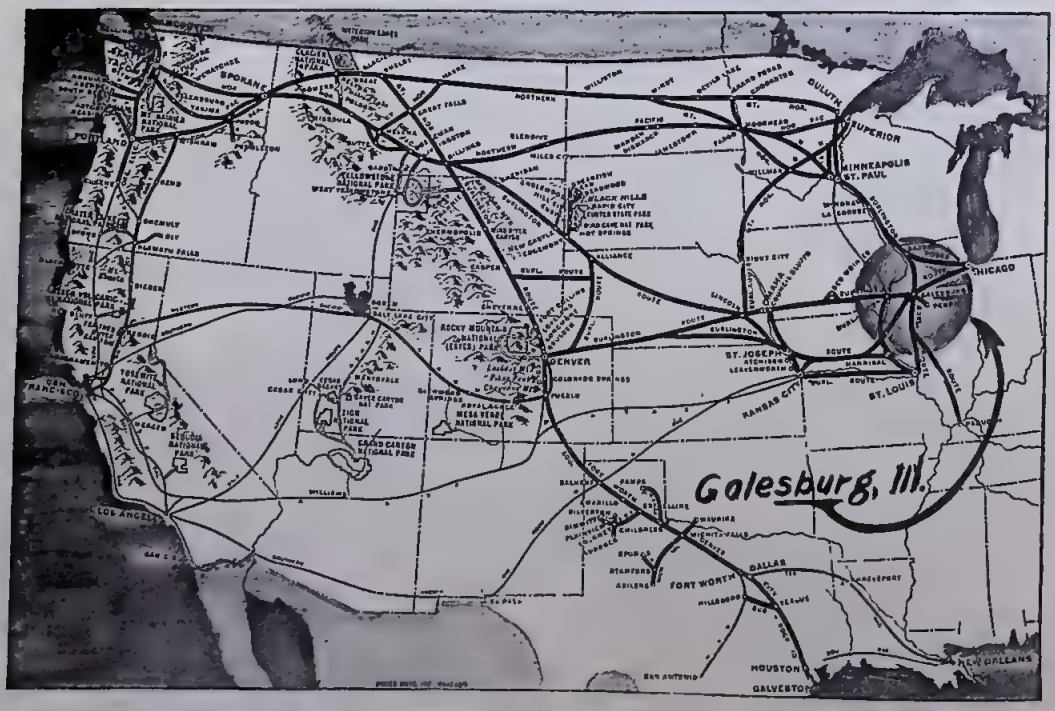
As the list is completed on the wire, yardmaster "Ackie" Johnson moves to a telephone, connected by a loudspeaker device with all points in the yard, and soon we hear: "No. 1 on 45—2 on 12—3 on 11—4 on 12—5 on 9."

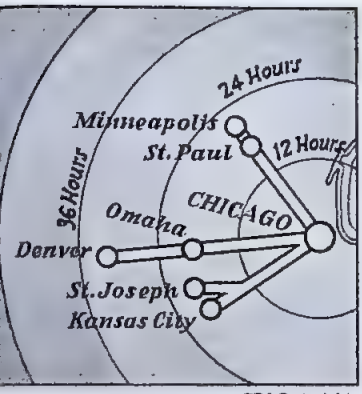
Johnson is advising his men where the cars will be switched. At 5:28 p.m., a huge switcher, the 6001, begins shoving the cars over the hump. As the first car is cut off it hits a four per cent grade for 150 feet, then Tower 1 applies the first retarder. Then the grade eases to 3½ per cent into the next retarder, where it can be slowed up, allowed



Railroads are helping to make the world shrink.

CB&Q freight, 1925.





CB&Q freight, 1940.

Courtesy Burlington Route.

Speeding freight.

Top, right, trainload of citrus fruit approaches Chicago in a snow storm on the Burlington's three-track main line. In warmer weather this train would make frequent stops for icing the cars. Careful planning of yard and other facilities has been just as important as the purchase of faster locomotives in speeding up the "Q's" freight. Most schedules are literally twice as fast as they were only 20 years ago.

Right center and bottom, the new and old hump yards at Galesburg now work as a pair. Picture of new yard was taken just before it was opened for traffic. The new yard's control towers can also be seen to the extreme left in the view of the old yard in operation. Closer to the camera are the second set of towers in the old yard, while the camera itself is located in the main tower. Notice that six cars are in motion simultaneously.

The map, left, shows the Burlington system, and its brothers, NP and GN, to the northwest. Galesburg is obviously the hub of activities in the eastern section of the system. Other busy points are Lincoln, St. Joseph, St. Paul, Denver, and Billings. The close tieup in the operations of the Burlington with Western Pacific and Denver & Rio Grande (in parallel with the Missouri Pacific, not shown) form a transcontinental route to California.

Courtesy Burlington Route.

to go through fast, or brought to a complete stop by one of the operators in Tower 2, who sends the car to its ultimate track.

At 6:09 p.m. the caboose of 67 is shoved over the hump, and the train is completely classified. Now switcher 556 moves in and does a job of "trimming" by going through the various tracks and shoving the cars toward the west end of the yard, near the departure tracks.

By 8 o'clock, Second 67 has arrived and been sorted out, after which the yardmaster at the departure yard gets busy. He hands a list to the engine foreman reading: "45 to 43 to 37 to 41 to 36 to 18 to 12." This makes up the train for the West, with all Denver cars on the rear of the train, western Nebraska points next, Lincoln and Northwest, and the other cars in station order, near the engine.

At 9:02 p.m. No. 67 pulls out of the yard for the main, with 57 cars and 2641 tons, headed for Burlington, Ottumwa, Lincoln and Denver.

Under ordinary conditions, without the heavy fog which slowed operations in getting 67 out, a train of 125 cars can be classified and switched in 20 to 25 minutes. The second-trick towermen recently handled 1387 cars over the hump between 4 p.m. and midnight.

The new Galesburg yard, westbound, has a capacity of 1460 cars. The longest track will hold 165 cars. The over-all length of the new yard, from the apex of the hump to the departure yards, is three miles, while the saucer of the classification tracks is ¾ mile long. Entire trackage in the Galesburg yards now is 210 miles.

There are 17 retarders, or track brakes, on the westbound hump. They are operated by air, and as the towerman turns a handle the brakes come into play on the outside of the rail to pinch the wheels of the car passing over. All retarders operate under 100 pounds air pressure, but an application of 20 pounds is sufficient on some cars, lightly loaded, to slow them down. The track switches are controlled by triggers, with a light showing if the switch is open or closed. The operator in Tower 1 controls the first retarder and three lead tracks, while the two men in Tower 2 control the 16 remaining retarders and all classification tracks on their panels.

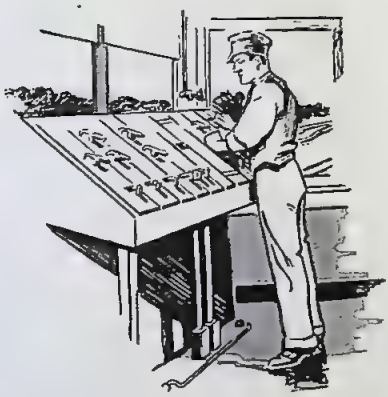
Mr. Fee explains that in addition to speeding the service, the road also hopes to save 104,025 freight-car-days annually, save 960 car-days every 24 hours during peak periods, and save approximately 45,000 tons of coal a year.

Beer from LaCrosse.

A refrigerator car from the Heileman Brewing Company, La Crosse, Wis., runs through a car retarder in the Burlington's Galesburg yards, in the photograph below. At top of page is a Burlington freight train as seen from the cupola of the caboose. Notice reflection in window.

Car Retarders

★ They speed up switching by controlling cars from a central point.



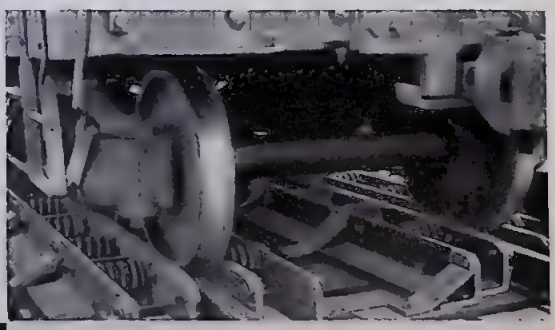
OPERATING a hump yard manually is fast, much faster than flat switching, but not fast enough where the traffic flows in trainload after trainload, especially where those trainloads bunch together in rush hours. So the signal engineers, always on the alert for mechanical and electrical methods of speeding traffic, invented the centrally controlled yard, with car retarders to slow the cars to just the right speeds as they roll down the hump and into the lead tracks, and with switch machines on all switches so they can be controlled from the tower.

Now the towerman takes the train list, showing weight, contents and destination of cars, and as the hump engine pushes the train over the top and a brakeman uncouples the cars, directs the cars at just the right speed into the right tracks. The outgoing trains are put together swiftly and without damage.

Several sets of retarders, just below the hump where all cars pass, and then down farther on the leads where the cars have already been split into various tracks, enable the towerman to give individual control to the speed of heavy and light cars and to cars which must go all the way down an empty track as well as to cars which go only a short distance before coupling to a train.

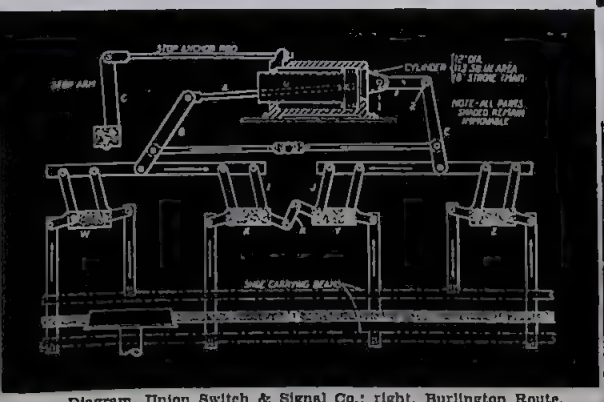
The power for retarders is either compressed air, electrically controlled, as made by Union Switch & Signal, or all-electric, as made by General Railway Signal. The shoes of the retarder grip the sides of the wheel rims, and are maintained exactly parallel by a system of levers (see diagram below) so as to lessen any chance of the wheels being forced up and off the track. So powerful are the retarders, however, that a towerman can apply enough pressure to lift a lightly loaded car right out of the shoes, in which case it is automatically rerailed at the end of the retarder .

Union Switch & Signal Co.

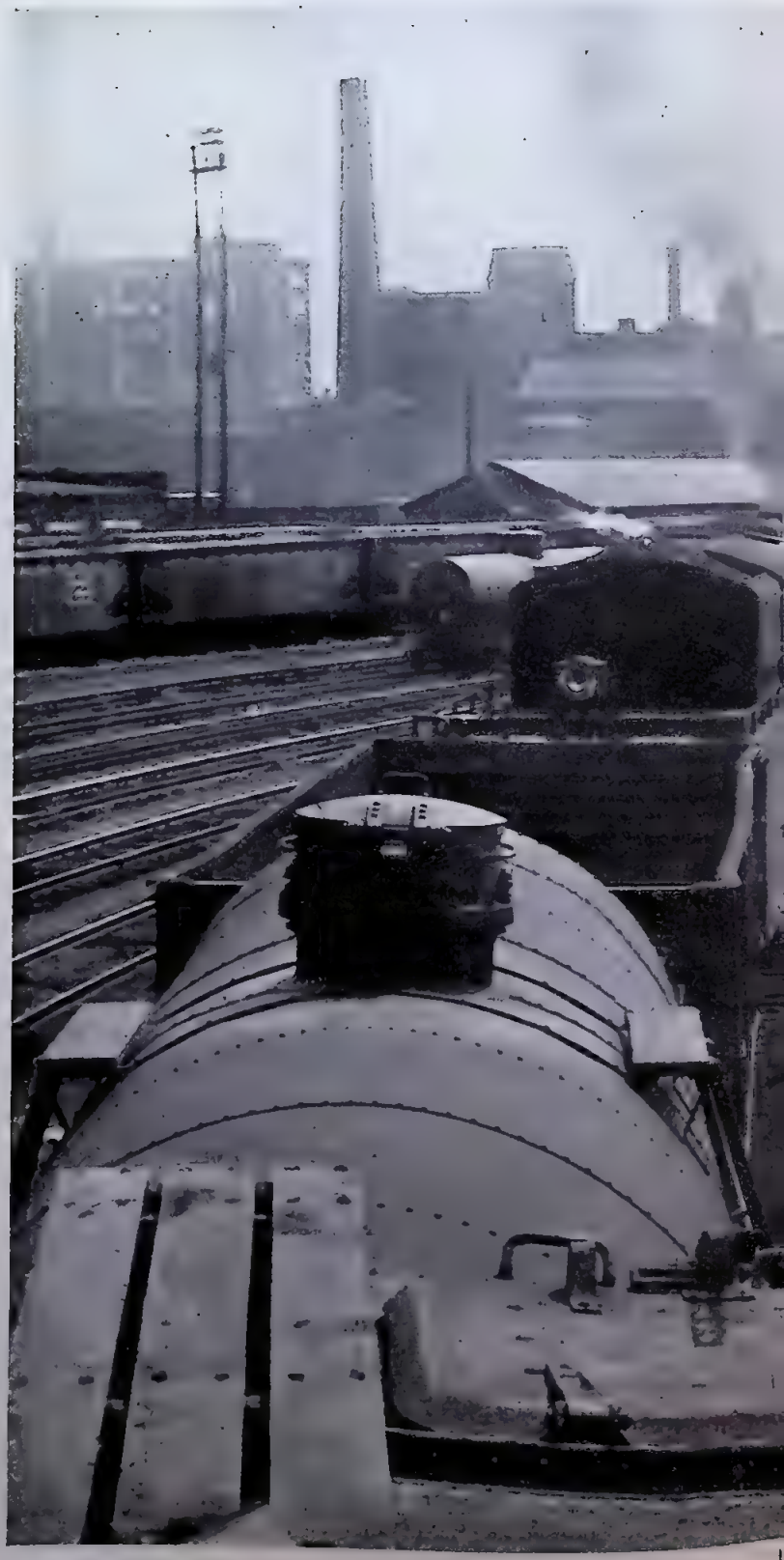


How car retarder works.

The diagram below illustrates how, by means of a system of levers, the car retarder applies an equal pressure to each side of the wheel rim and thus slows the car. Cushions of either air or springs keep the pressure from becoming too rigid. The amount of grip is under control of the towerman, who has a car list showing weight of each car as well as the track to which it is to be switched.



Diagram, Union Switch & Signal Co.; right, Burlington Route.



B&M transfer point.

The Boston & Maine's Somerville, Mass., yards are really an extension of the B&M Boston yards located less than three miles due east. Freight from as far west on the B&M as Troy, N. Y., travels across Massachusetts on the main line through Hoosac Tunnel and connects with still more freight (from Wells River, White River Junction, and Bellows Falls in Vermont) at Greenfield, Mass. Greenfield is the meeting point also for freight from Springfield and Holyoke. Farther east, at Ayer, freight rolls onto the main line from Worcester. Lowell, northeastward, sends its freight roaring Somerville-bound via Billerica, Bedford, Arlington, and Cambridge.

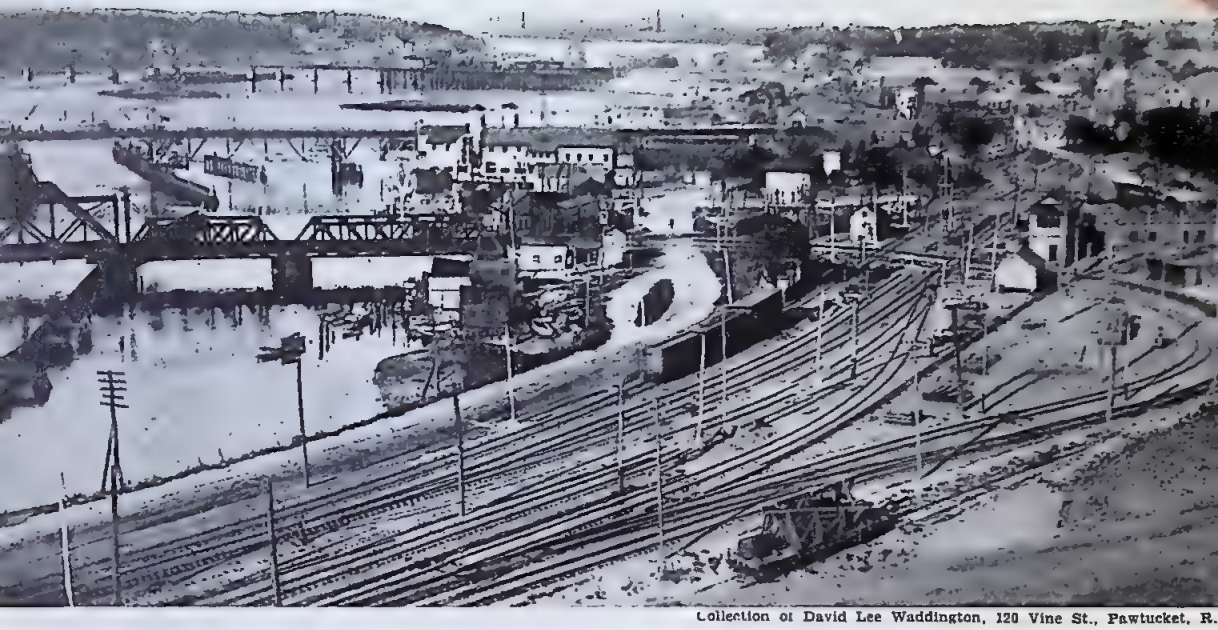
Henry W. Lessard, 60 Summer St., Malden, Mas

W. R. McGee.

SP in the Siskyous

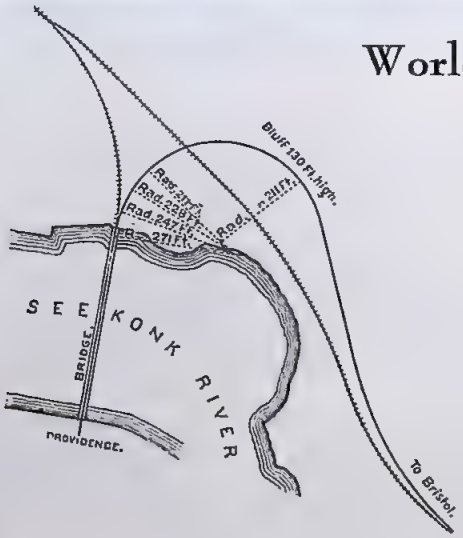
The old Southern Pacific main line from San Francisco to Portland is the Siskyou Route, now largely superseded by the more recent Cascade Route. The *Shasta Limited* (left, on a 2½ per cent grade) used to travel the Siskyou line, but now all through trains run over the Cascade line. Only an overnight local, the *Rogue River*, serves part of the Siskyou, connecting it with Portland. Buses give the connection to the south. But the line is tremendously important as a freight artery. It leaves the other line at Black Butte, just north of Dunsmuir, Calif., and rejoins at Eugene, Ore., thus giving the SP two routes over the mountains which separate the Sacramento Valley from the Willamette Valley. Both lines are scenic and winding, but the newer line quite naturally has the edge on both grades and mileage, being 25 miles shorter. The 52-car, 1750-ton freight below, with two helper engines at the rear, is climbing a Siskyou grade near Hilt, Calif.

W. R. McGee.



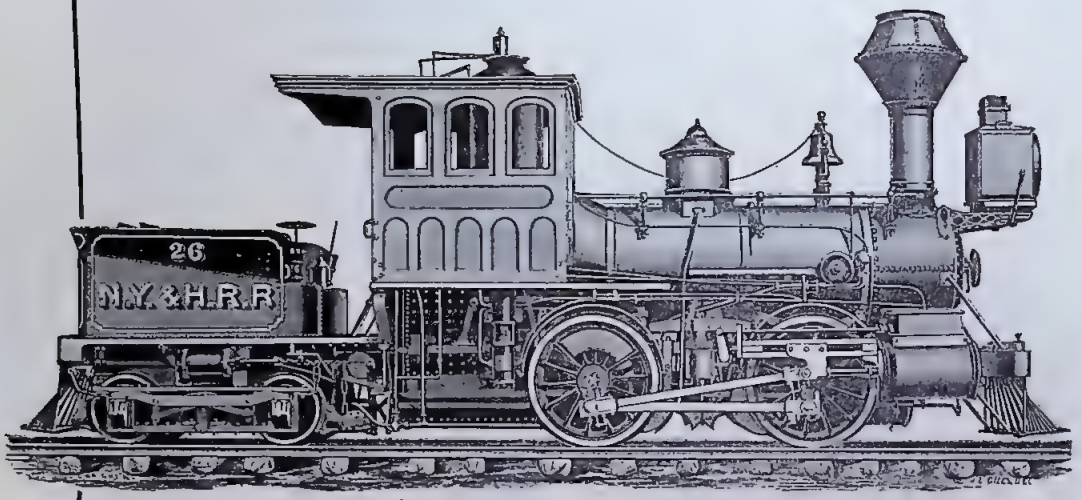
Collection of David Lee Waddington, 120 Vine St., Pawtucket, R.

World's sharpest curve.



Back in 1901, when electrification was in the experimental stages, the New Haven electrified its line from Providence to Warren and Bristol with a branch to Fall River. Suburban service on close headway was provided. Now the line is no longer electrified, the Fall River Branch is removed, and the rest carries only freight. The line at first left Providence over the bridge and sweeping curve (old photo, above), then known as the sharpest curve in the world although surpassed by many industrial tracks and now by the loop tracks in Grand Central Terminal. The old photos below show a Bristol train leaving Providence through the tunnel later built under College Hill, and a cable car pushing electric cars up College Hill on a route which later went through a streetcar tunnel that crossed over the electrified railroad tunnel.

David Lee Waddington collection.



Collection of T. W. Harron, 2070 Bryant St., San Francisco, Calif.

Old New York & Harlem Locomotive Engine.

Although the New York & Harlem was the first street railroad in the world, it is even more significant in that it became the most important end of the New York Central System, as you will learn from the Grand Central story on page 8. This locomotive was used in the late eighties on the Harlem Road, and it could hardly be better described than to quote a contemporary locomotive dictionary: The diagram "represents a heavy locomotive used for suburban traffic on the New York & Harlem Railroad. It was built by the Schenectady Locomotive Works, at Schenectady, N. Y. Engines of this kind are used for the trains between New York and Williams' Bridge, a distance of 11 miles. These trains are often very heavy, owing to excursions, races, etc., and, as the stopping places are very close together, very powerful engines are required for the service. The general plan of these engines is that which was patented by Mr. M. N. Forney. The frames which extend back of the fire box are continuous, although they do not appear to be so in the engraving. The Westinghouse brake has been applied to the truck and also to the driving wheels. Owing to the great weight on the latter and the power which the brake exerts on them and also on the truck, the engine can be stopped very quickly, and as there is plenty of adhesion, trains can be started without much danger of slipping." The following were the principal dimensions given for these engines:

Gauge of road	4'-8½"
Total wheel base	20'-11"
Driving wheel base	8'-8"
Total weight in working order	72,000 lbs.
Total weight on driving wheels	49,500 lbs.
Diameter of driving wheels	48"
Diameter of truck wheels	26"
Diameter of cylinders	15"
Stroke of cylinders	20"
Outside diameter of smallest boiler ring	44½"
Size of grate	35" x 53"
Number of tubes	144
Outside diameter of tubes	2"
Length of tubes	9'-6½"
Square feet of grate surface	18.5
Square feet of heating surface in fire box	81
Square feet of heating surface in tubes	710.4
Total feet of heating surface	804.28
Exhaust nozzles—single or double	Double
Diameter of nozzle	2½"
Throw of eccentrics	4½"
Outside lap of valve	⅞"
Inside lap of valve	1/16"
Size of main driving axle journal	6½" x 8"
Size of other driving axle journal	6½" x 8"
Size of truck axle journal	3¼" x 6"
Diameter of pump plunger	4¼"
Stroke of pump plunger	3½"
Capacity of tank	1200 gal.

W. C. Whittaker, 166 Embarcadero, San Francisco, Calif.

Western Pacific, above; Norfolk & Western, below.

At Keddie, Calif., the Northern California extension of the Western Pacific wyes off the main Feather River Canyon line and shoots northward to its junction with the Great Northern at Bieber, Calif. In Western Pacific traffic strategy this is an important junction. The small, neat engine terminal (above) is a short distance above the wye, which is just around the curve to the rear of the photo. The yard scene below is on the Norfolk & Western at Portsmouth, Va. Notice the car retarders on the top of the hump. The action of retarders is explained on page 25.

Courtesy
Norfolk & Western.

Jim Morley.

Lumber Railroad

★ **Fifty miles of crooked narrow-gauge railway with link-and-pin couplers and where cars are swung through the air.**

By Jim Morley.

DIAMOND stacks and link-and-pin couplers still hold forth in hidden corners of the Union. Browse around near the heart of the Mother Lode country of California and you may come upon that unique railroad with both these qualifications, the line known affectionately to local railfans as Michigan-Cal.

Lumber railroads are slowly disappearing from the forests of the Sierra Nevada Mountains. In many places logging ventures have quit for lack of timber; regions tapped within the last decade have seen the substitution of trucks for railroads. The Michigan-California Lumber Company, however, has too much invested in its 45-mile railroad system to change at present. The 38 miles of three-foot main line are spread out in the mountainous area northeast of Placerville, where memories of the hectic gold-rush days of the fifties still remain. Seven miles east of Placerville lies Camino, beginning of the Michigan-Cal. The narrow-gauge twists up and down to the edge of the canyon of the South Fork of the American River. The railroad stops, but a cable tramway leaps the half-mile gap to the other side, where the rails take up again and bend in convolutions up the side of Slab Creek to the sawmill at Pino Grande. From there the line heads east to the scene of actual logging.

All power south of the cable is oil-burning; all engines north of the cable are wood-burning, diamond-stacked machines (except for newly acquired No. 2, which will be retained as an oil-consumer on the north side). Aside from the 0-4-0 "dinky" at Camino, all are Shays.

The company also owns the Camino, Placerville & Lake Tahoe Railroad, eight miles of standard gauge with its own Shay locomotives, connecting with the Southern Pacific at Placerville and winding up to the 3100-foot elevation of Camino. This town is the terminus of the narrow-gauge, western headquarters for the company, and site of large drying yards, a finishing mill, and a box factory.

The drying yards cover the site of Seven-Mile Station, a stopping point on the Hangtown (now Placerville)-to-Carson-City stage road in the sixties. After the completion of the Virginia & Truckee in '69, traffic to the Comstock by this route fell off and went instead by Central Pacific and V&T. El Dorado County was quiet except for minor lumbering activity. In 1889 the American River Land & Lumber Company was organized and began cutting on a 10,000-acre tract on Slab Creek. Logs were driven down the South Fork of the American to Folsom. The first railroad entered the scene in '94, being constructed from the woods (present site of Pino Grande) to the north brink of South Fork Canyon, a distance of eight miles. A log chute was built from the edge of the canyon to the river a quarter mile below, a chute 3000 feet long and containing 1½ million feet of logs. A pool to receive the "shot" logs was formed at the base, and bad rock ledges were blasted out of the river all the way to Folsom. Motive power for the railroad was carried in piece by piece and assembled on the line.

Much trouble was encountered in driving logs down the American, and in 1900 new interests bought the timber land, Folsom Mill, and railroad, and studied the problem of getting the logs out of the wild Slab Creek region. It was D. H. McEwen who, while pondering beside the foot of the old log chute, suddenly exclaimed, "I will run a cable across this canyon and swing the lumber across." The Folsom sawmill was moved to Pino Grande, and in 1901 the first cable tramway was built from the head of

Jim Morley, 2635 Etna St., Berkeley, Calif.

Early-morning cacophony

All but one of the locomotives are Shay geared engines and they can negotiate very sharp curves and rather steep grades. No. 6 is shown here backing down to North Cable with a train of freshly sawed planks from Pino Grande ready to be dried in the Camino yards. On the opposite page, No. 10, at Pino, is starting into the woods for another load. Logs to the right were brought in on the preceding trip.

the old log chute on the north side of the river to a slightly lower point on the south side. There were two 1½-inch track cables, the span between supports was 2600 feet, and over the river one could gaze down 1200 feet to the swirling water. Power was supplied by twin steam engines at the southern terminal.

In 1902 the narrow-gauge railroad from the southern cable structure to Seven-Mile Station was finished, another eight miles. In the next year new mill installations were made at Seven-Mile, and the growing hamlet was rechristened Camino—Spanish for road. Timber was cut near Pino Grande, reduced to planks at the Pino Grande bandsaw mill, brought by rail to the cable, unloaded onto the cable car, slung across—2500 board-feet of green lumber to a load—reloaded onto lumber cars and taken to Camino by rail. After drying and planing, the finished lumber was hauled behind a 60-horsepower steam traction engine to Placerville. The construction in 1904 of the Camino, Placerville & Lake Tahoe did away with the last picturesque operation.

There were several changes of ownership and management during these years and the following ones. McEwen sold out to the El Dorado Lumber Company just after the cable was completed. This company ceased logging in the Fall of 1907. Wheels remained still until the Fall of 1911, when a Michigan lumberman by the name of C. D. Danaher bought everything the El Dorado outfit held. The Spring of 1912 saw lumbering begin again, and with it came modernizing: steam donkey engines took the place of oxen in snaking logs out of the woods. The railroad was functioning nicely. Ray Danaher and James Danaher Jr., as the R. E. Danaher Company, took over during 1916 and 1917. Then C. A. Smith, who had been acquiring a huge tract of choice sugar and ponderosa pine on the Georgetown Divide, sold to John W. Blodgett in May of 1917. Three months later the Danahers went in with Mr. Blodgett and emerged as the Michigan-California Lumber Company, which has operated continuously since.

The original cable was never quite strong enough to be satisfactory. More than once the track cables broke, letting the car dive

into the canyon. Occasionally, too, the haul-back cable snapped, as the time some officials and their wives were returning from a visit to Pino Grande. The cable car seesawed back and forth, pendulum style, finally coming to a rest at the bottom of the sag, an uncomfortable distance above the treetops. The party shivered there through a snow storm that night, and the next morning the haul-back was retrieved and repaired.

In 1929 the tramway was rebuilt with four two-inch track cables using over 12,000 feet of locked coil truck cable, with 6600 feet of one-inch steel traction rope as haul-back. The new installation sags more than its predecessor, so that the cable car is 1150 feet above the river as it passes between terminals. The car ordinarily carries a railroad car loaded with 12 tons of sawed lumber at a speed of 1800 feet per minute, and takes (including docking) about 105 seconds to cross the canyon. It is built of structural steel, weighs 12½ tons, is 12 feet wide, 22 deep, and 26 long. Passengers are supposed to ride in a cage built in the top part of the car, but as this wire compartment is continually spattered with heavy grease from the wheels, people ride on the main deck beside the lumber car, which is held secure by hooks locking over the axles. Constant tension on the track cables is maintained by free 60-ton concrete counterweights attached to the four cables at the southern terminal. Electric power is used, and brakes automatically slow the car when it reaches a certain speed going down to the bottom of the sag from either side.

The cable is exciting, but the fan is strongly attracted by the non-aerial railroading of Michigan-Cal. To understand the part the railroad plays in MC's operations, let us follow through the procedure of obtaining lumber. If rights are held to cut over national forest, a government man marks the trees that can be cut; if private territory, the foreman does the selecting, taking no tree less than 27 inches in diameter at breast height. The trees are accurately felled; buckers cut them into suitable sections; these sections are hauled by tractor to the landing, where a donkey engine hoists the logs onto the logging flats. Until the advent of the "cat," logs were dragged to the landing by a high-line, a cable passing from the donkey over the top of a spar tree and out into the woods. The dragging logs were very destructive of small growth. "Cat skinners" keep to a few routes and so avoid mangling most of the small trees. Mature trees are left along ridgetops so that seed will be blown into the valleys. These practices make up selective logging, forestalling erosion and providing for a second growth that will in time be ready to cut.

A government agent checks the diameter of trees as they are loaded. Then the railroad takes over. Several two- or three-mile spurs, each with a landing, run into the woods from the logging camp at the end of the "main line." Engines bring empty cars to the landing and wait while they are piled with logs, then bring them back to the camp. After enough have been accumulated for a train, a heavier engine than those employed on

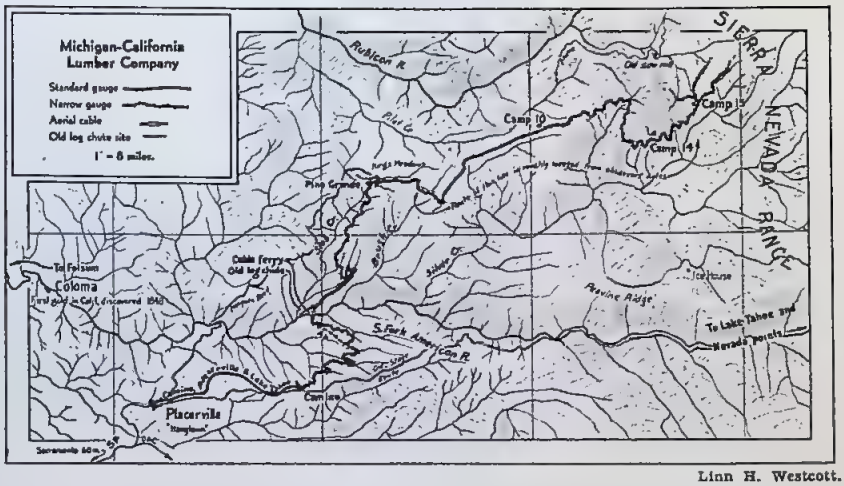
Jim Morley.

Offset boiler.

Shay geared locomotives have their cylinders in a vertical position on the right side of the fire box. To balance their weight the boiler is offset to the left, giving these engines a characteristic appearance. No. 3 works between South Cable and Camino, the last lap of the narrow-gauge. The company also operates the standard-gauge Camino, Placerville & Lake Tahoe Railroad. Photo on opposite page is of No. 7.

Route of the Mich-Cal.

Nestled in the Sierra Nevada Mountains of California, the narrow-gauge Michigan-Cal winds for 38 mainline miles to connect with the eight-mile Camino, Placerville & Lake Tahoe, standard-gauge line also owned by the lumber company. Placerville was once called Hangtown because its numerous early-day outlaws were hanged in pairs.



Linn H. Westcott.

the spurs take the string, backing with it to (usually) old Camp 14, where a meet with a train of empties is effected. The two locos exchange trains and the new power begins throwing wood cinders over the trailing logs. Around promontories and over trestles contours the train, battling a stiff grade to Camp 10, where another train of empties is met. Another trade, and the logs are on the last lap down the hill to the mill at Pino Grande. Before being dumped into the long pond their diameter is taken by a scaler who, by means of a scale on the long measuring stick he carries, calculates the number of board feet in each log, allowing for fire burn, wind check, and other defects. He can also tell which logs will sink if put in the pond; these "sinkers" must be unloaded on the dry platform.

A donkey tightens up the cable put under the logs and they tumble into the pond, and are floated to the endless chain with hooks that will take them under a high-pressure shower bath up into the mill. Skilled operators and quick-acting machines shove the logs through the two big bandsaws of the mill. These saws must be replaced every four hours; they are then resharpened and reused. A re-sawer trims the rough planks to the desired size if they are not quite right. The sawdust is burned to generate steam power for all the mill's purposes. Some lumber is put into the hot-air kiln, the rest is loaded onto lumber flats—consisting of two trucks

Hugh Daugherty.

With greatest of ease.

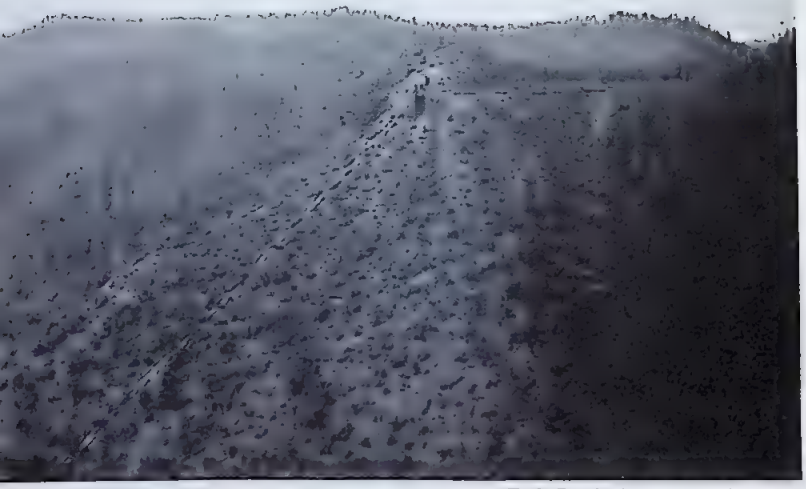
The aerial ferry takes narrow-gauge cars and their loads a half mile over the American River in less than two minutes. Its cables are so far above the water that the Chrysler Building could be rebuilt beneath them on the river bed and it would still take a feather duster with a handle over 100 feet long to polish off the top of the flagpole. Originally lumber from the railroad on the north side was scooted down a timber chute and floated down the river. Traces of the old chute can barely be seen *(Continued on page 37)*

connected with a big beam, with small cross-beams over each truck—to be shipped to Camino for drying. Locomotive No. 6 handles the three daily trains of lumber to the north cable terminal. Down the mountainside, high above Slab Creek, she winds with her cargo of sweet-smelling pine, gently rumbling over 30 trestles in the eight-mile stretch.

The six-spot leaves her string of loaded cars a short distance above the barn-like cable housing and couples onto the line of empties previously ferried across. With gears whirling madly and smoke pouring back from her diamond stack, and with veteran engineer Frank Zeiss at the throttle, she begins the grind back to Pino Grande.

One by one the cars of lumber are coasted onto the cable car. A great clatter of wheels is followed by a penetrating whir as the "ferry" leaves the housing and soars over the canyon. For a few seconds its speed down the sag increases quickly, then is checked by the automatic brakes at the south terminal. It is not a good moment to be looking over the front edge of the car. The rest of the trip is a smooth glide, ended by another chattering of wheels and a groaning of beams at the southern housing. In the darkness of the shed huge blue-green sparks jump and crackle behind the wire screening protecting the transformers and circuit breakers, as the man in charge applies short jerks of power to bring the cable car up to the very edge of the dock. A cable attached to an electrically driven winch is used to pull the car off its carrier, after the axle-locks have been released. An empty car is sent back. The next train from Camino drops its empties and loses no time in hooking onto

Jim Morley.



Hugh Daugherty, San Leandro, Calif.

running up the north bank to the cable house. The cable was made necessary because of the large number of log jams in the river on its way to Folsom Mills. Below, right, brakeman rides a coasting car to the north landing; left, a load starts across the canyon. Passengers are supposed to ride in a safety cage on top of the cable car, but grease thrown from the wheels drives everyone down to the track platform. The four paired photographs on these pages are from separate negatives and joined to form a panorama. This explains the track which makes a jog in the lower pair.

the cars of lumber and whistling off. No. 3, on the head end, is a 65-ton oil-burning job and snakes the cars up the hill in good, if slow, style. One stop for water is made in the hour journey. The exhaust tosses even the higher branches of overhanging firs and pines, bringing down a shower of needles and twigs.

A long blast of the whistle signifies the nearing of Camino, where No. 3 picks up more empties for another trip while the two-spot handles the cars of fresh lumber. Brakemen ride the cars down the steep grades into the far reaches of the drying yard. Occasionally a car gets away and scatters lumber (and maybe brakeman) over the landscape beyond the bumper at the end of the track.

After proper seasoning the lumber is sorted and kept in a rough storage shed until its turn comes to be planed and cut into many sizes and shapes, from tongue-and-groove flooring to window sashes and molding. Or it may be made into boxes. All these products are then shipped by thrice-weekly CP&LT trains to Placerville, and from there to the outside world via Southern Pacific. In the warm Summer months care is taken to run over the CP&LT early in the morning, before the sun has had time to heat the rails and so cause them to creep downhill more easily under the stress of the train.

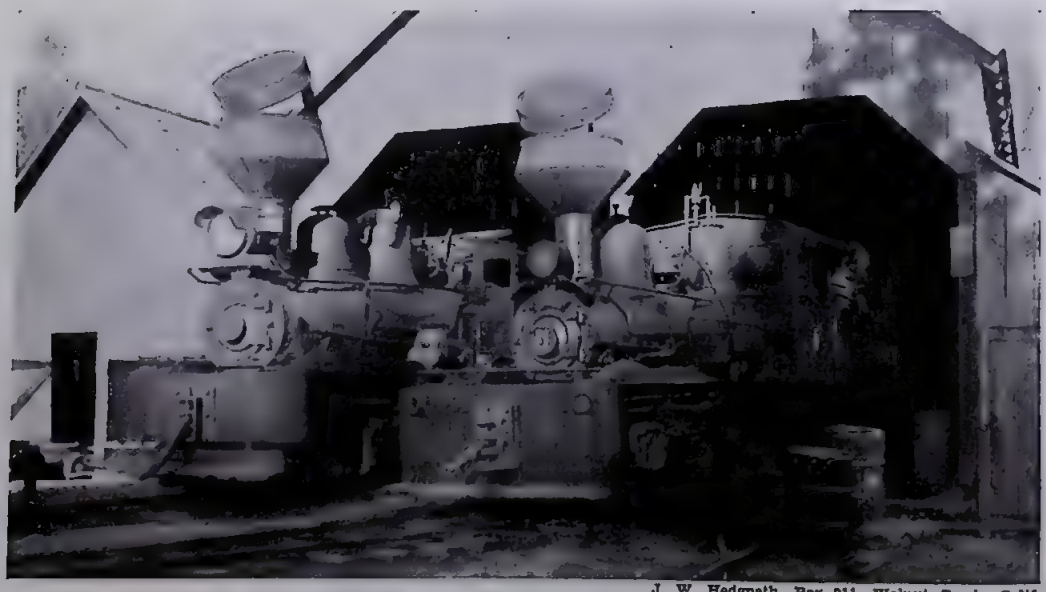
The narrow-gauge Michigan-Cal can, then, be divided into four main pieces: Camino to the cable; cable to Pino Grande, Pino Grande to Camp 15; Camp 15 to woods. (Pino Grande has entirely lost its Spanish pronunciation in the talk of local citizens; although they pronounce Camino "Ka-*meen*-o," which is correct, they also say "Pine-o Grandee," and abbreviate it to Pino.) Probably the best track in the system is the Camino-cable stretch. The cable-Pino section comes next, Pino-Camp 15 a few notches below that, and the spur tracks beneath the latter. The spurs are quite temporary, of course, and there is no reason to build them too well. Logging railroad construction is in a class by itself. In the days of high-lining all grading was done by hand. The surveyors went around the very point of each ridge and used trestles to cross the creeks. Now a bulldozer pushes through the point of a ridge and uses the dirt to make a fill across the next low spot. This saves much time and eliminates the trestle fire hazard and continual replacement of bridge timbers. It may cause trouble in wet weather, though. Inasmuch as dirt, crowned between the rails

Jim Morley.

Overturned locomotive and cat skinner, J. F. Corker, Camino, Calif.; others, Jim Morley.

Scenes on the lumber line.

From left to right, top to bottom: Locomotive No. 9 pulls a string of empty cars toward Camp 15 over a new fill. No. 3 left its trucks and turned over after hitting a soft spot. The string of loaded cars is starting for Camino from South Cable; below it a cat skinner and his cat move logs to the landing. This saves many small trees for future forests. After a day's work, locomotives with banked fires stand near semi-portable houses at Camp 15. The spark screens are propped up to insure steady draft for the fires. Below, engines 6 and 5 wait at Pino Grande during breakfast for the new day of work.



J. W. Hedgpeth, Box 911, Walnut Creek, Calif.

for drainage, is the only ballast, a good many soft spots develop during the Spring thaw. The usual remedy for this is to put a few cedar planks under the track, crosswise to the ties. The spurs are thrown down hastily, and when of no more use the steel gang tears up the rail for use elsewhere.

Sometimes parts of the main lines are relocated. Thus a dangerous 7 per cent grade was removed in 1927 from the cable-Camino run, and the end portion of the Pino-Camp 15 section was changed to gain enough elevation to reach a ridgetop. Everywhere through the logged-over woods run abandoned grades. The rail runs about 35 pounds to the yard and some of it came from the "Dutch Flat Road," the beginning of the Central Pacific. Mainline grades usually do not exceed 4 per cent, spurs 4½ or 5 per cent. Most of the time the rise is more gentle, for the short-radius curves provide plenty of friction. This same factor is advantageous in holding back trains on downhill runs.

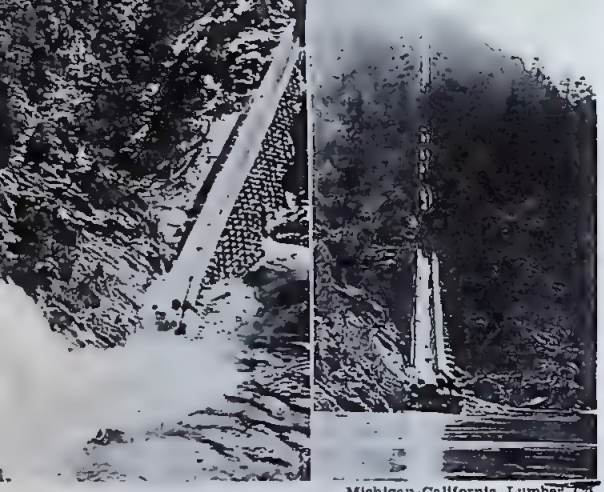
Each camp remains in the same location two or three years, during which period the surrounding country is logged. Then the bunk houses are loaded onto flat cars, the mess hall is knocked apart, and the exodus to the next spot is on. "The next spot" is one to five miles farther along. If convenient, one of the spurs is retained as the new piece of main, and so the railroad grows.

This increasing distance—it is now 22 miles by railroad from Pino to Camp 15, about 12 in a beeline—is making more and more difficult the fueling of locomotives, as slab wood from the mill must be loaded onto cars, hauled to the many wood piles along the line, and unloaded by hand. It is becoming a nuisance. Water is not a problem.

Both cars and engines take a beating. Link-and-pin couplers are used exclusively. The company provides little wooden paddles to guide the link into the opposing socket, but these safety devices are not used except by those men putting strings of cars together at the cable, where it is easy to keep a paddle handy. The link and pin is a simple, inexpensive arrangement, but requires a good eye and quick hand.

All brakes, aside from the air or steam jam on engines, are of the armstrong variety. Straight air on all cars was tried once but the system was too hard to maintain in the

Construction of Mich-Cal lines.
From the album of J. F. Corker, the civil engineer.



Michigan-California Lumber Co.

World's longest chute?

Maybe it was, when it was built in 1894. Huge logs were dropped from railroad cars at the top and scooted down 3000 feet to the South Fork, American River. The spray of a launching log can be seen to the left. The chute itself contained 1½ million feet of lumber. It was dismantled when the cable ferry was built, but scars in the surface of the mountain slope still mark its site.

rugged railroading of the logging pike and the idea was forgotten. On the wooden-truck cars once used, the brakes of each truck had to be set separately with a 10-foot pole fitting into a ratchet socket. A man could then stand on top of a load of lumber and work the pole back and forth. It was a dangerous thrill stopping a runaway on the 7 per cent grade south of the cable with those brakes. And there was more than one runaway. The links and pins provide so much slack that the running in or taking out of slack on a long train may kick a pin out, releasing part of the consist and an unhappy brakeman. Sit on the rear car of a 15-car train and listen to the slack being taken in. Jing-clink-thunk-chank-clinkle-*wham!* and your car begins to move, many seconds after the locomotive has started on its way.

The cars rattle along limply, the bolts loose here and there, with a who-gives-a-damn attitude. Wheels are pitted and liberally sprinkled with flat spots. To slide a truck one hundred, three hundred yards—what is the difference? A conductor and brakeman ride each train, one man on the last car and one near the engine, in handy positions to pass along signals. It is usually not necessary to set brakes on more than the two cars the men are riding. Not all cars are for logs or lumber. There are flat-topped cars to carry supplies and men, and slab cars to carry the waste wood to refueling points. There is even an all-steel flat for heavy machinery and the fire truck.

Motive power is distributed according to weight, especially in Spring. The badly laid spurs are given 35-ton machines; the Camp 15-Pino track will stand up under engines weighing up to 45 tons. Top speed of the Shays is seldom reached for fear of derailing. Most hauling is done at five to 10 miles an hour. Derailments are quite frequent and an accepted hardship. Engine crews continually watch for signs of soft track and are ready to jump if their charge starts wobbling too much. Likewise, brakemen get to know the feel of a car as it is about to leave the iron. They always try to leave first.

One conductor tells this story: He was on a car near the rear of a train of empties. The engine was hidden around a sharp bend when the car he was standing on bounced off the rails and skewed around almost crosswise to the track, and kept on going with the con riding the bucking car. It was impossible for him to signal the engineer to stop, but a group of other men were standing at the bend and, having seen the mishap, could have given a washout to the engine crew. Did they signal? They stood laughing at the spectacle until the engineer figured something was wrong and stopped.

As most of the Michigan-Cal track is laid out on some steep hillside, a derailed engine always manages to roll down the bank, leaving her trucks behind her. Anybody riding the tender, who doesn't jump, may be killed in such a case. Those in the cab are either more on the alert and get off more quickly or are protected by the cab structure.

The fact that there are three divisions on the railroad makes it unnecessary to run through trains. Keeping one engine on one division enables its crew to know the conditions on that piece of roadbed and simplifies meets. There are three trains each way daily here, too, unless bad weather lessens the number of logs cut. The division point between camps 10 and 15 may be changed from day to day, leading to a not-infrequent cornfield meet. As the conductor said, "Somebody gets up bleary-eyed some morning and forgets what place he's s'posed to meet the other train. Too slow to do damage? With trains behind 'em they can do plenty!"

Opening the line in March or early April is a big job. The elevation of Pino Grande

J. F. Corker.

Lumbering may be dangerous, but it's also healthy work.

After a tasty plate of bacon and eggs and a thick-walled cup of coffee, the lumbermen ride flat cars through the moist morning air to the location of the day's work. Fuel for the locomotives is scrap from the mills, and, since it is wood and burns fast, stops for refueling are frequent muscle-builders for the crew. Rain-soaked or pitchy pieces are avoided because they create excessive soot.

Jim Morl

Extra!

Railroad abandoned; not enough automobiles!

Due to rationing of gasoline, many autoists in Los Angeles are leaving their cars at home. And while the narrow-gauge streetcars prosper—even bulge—L. A.'s little Court Flight Railroad is being scrapped. Court Flight is very much like Angel's Flight, described in the November 1942 TRAINS. At the top of the incline motorists parked their cars and paid low fares to descend the hill to their places of business via the cable cars. Now there are too few motorists (and a scarcity of labor as well) to keep the railroad running. Operation ceased last October 1, according to the *Western Railroader*.

is 4100 feet, that of Camp 15 another 1400 feet. Snow lies deep in between. Sheet-metal plows plastered on engine fronts formerly did the work. After the Hobart Southern, logging line near Truckee, shut down, Michigan-Cal acquired its big narrow-gauge wedge plow. The plow was partially rotten but is now rebuilt into an efficient unit.

When snow begins to pile up too deep for logging, all operations cease for the Winter. The stopping point is reached around Christmas. All work is based on a five-day week of 40 hours. If the men have a car or can hook a ride they go to Placerville for a good time over the weekend. Bad roads do invade the land of the diamond stack. There is a tale of one man who had to be back at work at Pino the next morning, and he without transportation from Placerville. So during the night he walked to Camino and out to the cable, crawled across the canyon clinging to two of the four track cables, and walked up to Pino. He told his fellow workers this and had the grease to go with it, but some doubters remain. Some of the men loaf during the idle Winter months; others find jobs in the Sacramento Valley.

While others hunt for better-paying work, an MC railroad section boss says this: "I like the climate, like to breathe the good clean air; I got my health and a good appetite. Plenty of good food, a place to sleep, a little money for a few things. What more do you want?" The many accents and many cusswords stem from men who are as tough, but not as rough, as they think they are. A majority of the men like their jobs, both on the actual logging and railroad ends. A logging railroad is not of the safest type to operate, but the safety record has been good, considering the hazards.

Michigan-Cal holds rights on enough more first-growth timber to last another 40 years at the present rate of cutting. By then the second-growth should be marketable in the original cut-over areas. Most of the trees taken are sugar pine and ponderosa pine, the best to sell generally. Some cedar for pencil stock is cut, and red and white fir is also taken, mostly for the MC's own railroad bridge timbers. All these different woods are well mixed on the Georgetown Divide.

So if trucks don't take over, the railroad has a long future. It is an expensive part of the operations, however, and the cable is considered a bottleneck. Trucks rumbling down the Mosquito Grade Road into South Fork Canyon and out to the highway might look better in the company's books, but not in pictures.

Arise at the camp at 5:45 on a cool, sparkling Spring morning; absorb all the eggs, bacon, pancakes, toast, jam, pastries and coffee you can at a 6:10 breakfast cooked by an experienced chef and assistants; throw your pack onto the wide running board beside the offset boiler of No. 9, and stand by the nice warm smokebox. Listen to the light chuffing of the exhaust, watch wood cinders flitting out of the big stack above you, watch the cars of logs squealing around the bend; look down into a valley filled with morning mist, with dark spires of trees emerging from the grayness; feel your pants grow hotter as the smokebox heats up with the fighting of a grade. Or stand near the cable and hear the howling of flanges as two trains approach the tramway, one from Pino and the other from Camino. The noise will be punctuated by the echoing clatter of the cable car rushing out of the dock, precariously providing the missing link in the railroad system. That is Michigan-Cal.

Railroad Ups and Downs

★ More traffic than in 1907, handled more efficiently, but roads profit less.

RAILROAD history during the last 36 years falls naturally into three periods, and these are reviewed in *Railway Age* by Samuel O. Dunn, its editor. Mr. Dunn, who has been successively associate editor, managing editor, and now editor of the *Age* and chairman of the board of Simmons-Boardman Publishing Corporation, is one of the keenest analysts of the economic and management aspects of the railroad industry.

"In 1907," writes Mr. Dunn, "most conditions were different in the railroad field than they are at present, but, significantly, not all of them. Thirty-six years ago, as now, the nation had full employment and the railways had a manpower shortage; and the railways had—or thought they had—a much greater shortage of facilities than they now fear that they may have. This in spite of the fact that they then had more employees, locomotives and cars than now with which to handle a smaller traffic.

"Because of financial abuses, rebating, political activities, shortage of cars and a terrible accident record, the railways entered the period beginning in 1906 as probably the most unpopular industry that ever existed. They had hardly a friend outside of Wall Street and their own offices. Farmers and business men were their bitterest enemies.

"There was then quoted an open letter by James J. Hill to the governor of Minnesota showing that, in the preceding decade, ton-miles had increased 118 per cent and passenger-miles 95 per cent, as compared with mileage, 21 per cent; locomotives, 35 per cent; passenger cars, 23 per cent; and freight cars, 45 per cent. 'The investor,' said Mr. Hill, 'declines to put his money into enterprises under ban of unpopularity, and even threatened by individuals and political parties with confiscation or transfer to the state.'

"The adoption of government operation in 1918 was generally accepted by railway officers as the death knell of private ownership. On the contrary, it probably saved it. For government operation soon substituted its own unpopularity for that of private management.

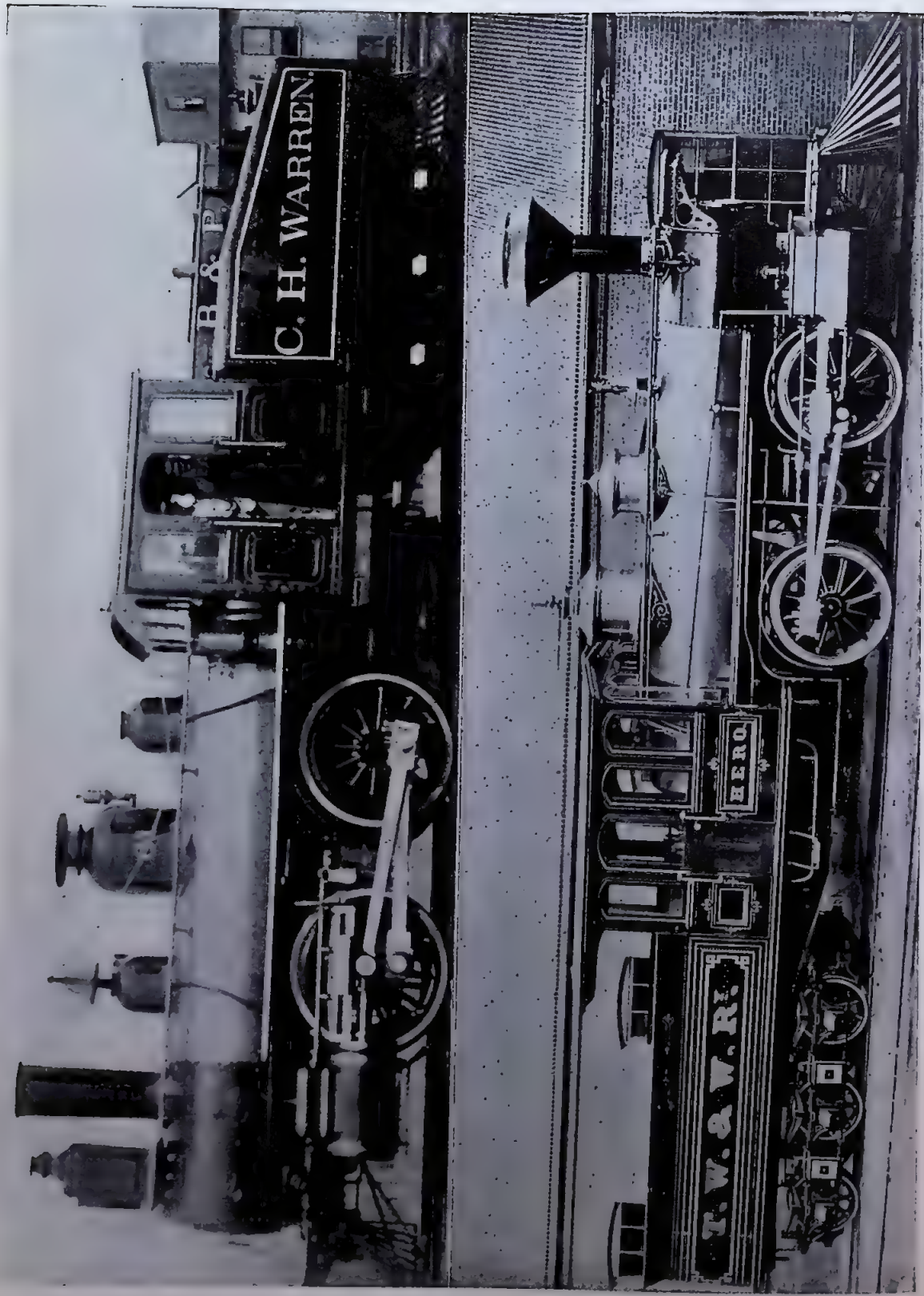
"There was a great public relations and legislative battle fought in 1919 to secure passage of the Transportation Act under which the railways were returned to private operation. It was the most constructive transportation legislation ever passed; and it was essential. Under government operation the margin between earnings and expenses had been so reduced that, without advances of rate, reductions of unit cost, or both, no possible increase in efficiency and economy could have saved the railroad industry from general bankruptcy."

Mr. Dunn then tells how the railroads in the last 20 years fought not only the public relations battle which has placed them high in public favor, but the management battle which has culminated in the outstanding wartime performance of today. "With almost no increase in investment or equipment, and principally because of intensive development before the depression, the railways succeeded in 1942 in handling a traffic which in three years had increased 90 per cent in ton-miles and 135 per cent in passenger-miles.

"In 1942, as compared with 1906, the railroad industry had (1) more than doubled its investment; (2) trebeled its service in handling traffic; (3) quadrupled the average annual pay of its employees (from $529 to $2286); (4) trebled its operating expenses; (5) had its taxes increased 1725 per cent; but (6) had not doubled its net operating income nor its net income available for dividends and improvements.

"In the 10 years ending with 1906—during which time it was recovering from the depression of the nineties—the railway industry earned an average of 4.83 per cent on investment; and its net operating income of 720 million dollars in 1906 yielded a return of 5.8 per cent. In the 10 years ending with 1942 it earned an average of only 2.56 per cent on investment; and its record net operating income of one billion 390 million dollars in 1942 yielded a return of only 5.23 per cent."

Samuel O. Dunn.



Collection of Arthur Curran, 16 Ballard St., Newton Center, Mass.

They Look Alike

★ But one was a Forney and the other a Fairlie, which could negotiate the sharpest curves but was not built for speed.

By Arthur Curran.

HERE are a couple of old-time engines which look fundamentally alike—and were, so far as the wheel arrangement is concerned, both being of the 0-4-6 type. There were, however, essential differences.

The *C. H. Warren* was a Forney built by the Rhode Island Works in 1886 for the Boston & Providence (now New Haven) with 17″ x 20″ cylinders, 54″ drivers, and weight of 114,000 pounds. With others of his class, *C. H. Warren* was designed for suburban service in the Boston district. The curious fruit-dish on the steam dome was a muffler to soften the sound of the steam when *C. H.* blew off. The Bostonians of those days must have had more sensitive ears than their successors of the present day, to judge by today's raucous auto horns and barking dogs!

The *Hero* offers proof of the fact that "things are not always what they seem," being a Fairlie built by the Mason Machine Works and completed on March 17, 1874, for the Toledo, Wabash & Western (Wabash). Builder's No. 525, Road No. 187, the *Hero* had 15″ x 22″ cylinders, 48″ drivers, and weight (on drivers) of 55,000 pounds. The engine is shown new, before the headlight was applied. Some railroad companies preferred to apply headlights of their own choice, and therefore ordered engines minus this detail, and, not infrequently, minus other details also.

The Fairlie design involved the grouping of drivers in a truck having radial, lateral, and rolling motion. This, of course, required flexible steam connections with the consequent possibility of leakage. Such engines could traverse very sharp curves, but had an unsteady motion which restricted their speed.

William Mason, who made great efforts to popularize the Fairlie design, was born at Mystic, Conn., in 1808. His early interest was in textile machinery, eventually turning to locomotives, for the building of which he established a plant at Taunton, Mass. He began with the American (4-4-0) type, of which he built some very beautiful examples, then became interested in the Fairlie in 1871. After building a number of these locomotives, he changed the name to Bogie, the English name for truck. The designation is correct, as these engines were not articulated.

Mason Bogies were used on a number of railroads from the Atlantic to the Pacific. Indeed, more were built than might be supposed. And, of course, Mason continued to build 4-4-0 locomotives until his death in 1884. His successors carried on the business until 1889, and then quit. By that time, competition in the business was so strong that only the strongest builders could survive. Then, too, many roads had their favorite locomotive builders and would not buy from any other source.

Letters

★ Interesting sidelights on railroads as readers observe them.

Service Restored.

In February, 1942, you published my letter about the abandonment of passenger service on the Pennsylvania-Reading Seashore Lines' Bridgeton, Salem and Pennsgrove branches.

The communities along the right of way objected so strenuously that the case was carried to the courts. Now the court orders no abandonment.

The rationing of gas and tires has called for a good system of transportation and the buses can not handle it, so it falls upon the railroad. The Bridgeton Board of Trade has asked for an even better passenger service than before. They also want through trains instead of the necessity of changing trains at Glassboro.

Donald Wentzel.

320 N. 7th St., Millville, N. J.

New English Loco.

The war has scattered a lot of us railfans over large portions of the map, and I am at the moment scattered across the pond and having a very interesting time of it, thank you. I flew over with the R. A. F., as a matter of fact, but don't get the idea I'm *in* the R. A. F. I'm working for Uncle Sam's Navy, and very proud of the fact. Right now I'm in London on leave, and making the most of it. The boys and gals here certainly know how to show us a good time.

The other day, through the combined help of a navy uniform and a British model fan friend of mine, I had a most interesting scoop. He and I were permitted to visit the new locomotive CC-1 [see cut], recently completed and now undergoing tests at a south coast town on the Southern Railway. I think it was darned nice of the Southern to let us in on it, and it's just one more evidence of the way people over here are going out of their way to do things for us.

It's going to be pretty hard to tell you much about her, because she's a fearfully hush-hush proposition, so much so that I was amazed they let us even see her. She's absolutely revolutionary. The secret features were shown us and explained in detail and we were merely told it wasn't to go any

Southern Railway (England), via Lt. Allan Lake Rice.

New railroad books.

TRAINS ALBUMS OF PHOTOGRAPHS. Book I, Eastern Railroads; Book II, Far Western Railroads; Book III, Midwestern Railroads; Book IV, Colorado Railroads. $1 per book. Kalmbach Publishing Co., Milwaukee, Wis.

PICTURES of old and new railroads, famous locomotives and trains, narrow-gauge and interurban lines, startling night shots and crowded yard scenes, speeding trains bending into curves—all these and many more, caught in the fraction of a second by the eye of a camera and faithfully reproduced, live again on the pages of TRAINS *Albums*. Pictorially presenting the American railroad scene in album form is a brand-new idea.

The publishers of TRAINS carefully selected the very best pictures from their files and from those that have appeared in TRAINS for two years. Men who have for years specialized in railroad photography contributed the finest of their work. Among the dozens of originals are the vivid camera portrayals by Linn H. Westcott; the living, pounding action shots by Lucius Beebe; and a rough yet romantic early-day Colorado photo by the late William Hunt Jackson.

Each of the four *Albums* contains a page of foreword about the section of the United States it represents. Then follow 22 large pages of pictures, each page printed on one side only. Many pictures are full page size (14" x 10"—double the area of a TRAINS page), and most of these have never before been published. Every picture is so laid out that it may be taken from the *Album* and framed. The captions give a brief but clear word picture of the subjects covered. The high-gloss paper used, combined with excellent engraving work, has resulted in each *Album* being a delight to the eye of the railroad lover.

farther. So I've got to play cricket and not tell the things that are fairly spilling out of me. All I can say is that you'd better keep eyes and ears open for the first public announcement of the lowdown on CC-1.

She's an electric locomotive, mind you, operating from a 600-volt third rail. The Southern has electrified nearly half its trackage and most of the trains out of London are multiple units. This is its first electric loco. She has overcome one of the big problems connected with the third-rail operation of locomotives. *She can stop on a gap in the third rail and start up again with a heavy train behind her!* On the Pennsy they used to have an overhead third rail at ladders in the yards, and the NYC still does. That's pretty cumbersome. The Metropolitan in London used to fit the last coach with a third-rail shoe. But it would be hard to rig on a freight train. CC-1 is to haul freight as well as passengers. The third rail isn't healthy in freight yards. But CC-1 has this clever affair built right into her that bridges all these difficulties. Clever? It's colossal. Try and and figure it out for yourself. I know what I thought it must be when I heard what she could do. You are probably suggesting the same thing under your breath right now. Well, you're wrong. You say you didn't mean that one, but the other thing? Wrong again. This is something brand-new, I tell you. Stand by for an eye-opener. Everything new doesn't come out of the U. S. A.

They had another problem to face in handling freight electrically at high speed. British freight cars have no air brakes and no catwalks on the top for a brakeman to run along. Brakes can only be set on each car individually from the ground beside the track. Of course you're entitled to say that's a hell of a way to run a railroad, but that's the way they do it. Add to that the fact that there is a great deal more slack in British freight couplings. "Goods waggons" are coupled with three links of chain hung over a hook on each car. When pulling, the buffers are many inches apart. When the train slows down, the cars bunch together, and as the buffers hit there is a tinkling as of cracked tea-cups all down the train, far different from the thundering crash of the slack running through an American freight, but far more devastating to the crew in the brake-van (caboose), because the slack is so great.

You can see what would happen if CC-1 were waltzing along with a freight drag at 60 and the dead-man control or an emergency

application suddenly came into play. Well, all I can say is that like Ed Wynn, they have an invention for that, too. It is also entirely self-contained in the loco. Watch for details. It's a dilly.

One novel feature I *am* allowed to mention. (This one'll slay you.) There's an electric hot-plate in the cab for the engineer's tea!

On the way back to London we were permitted to ride the cab. But that's another story.

Lt. Allan Lake Rice, U. S. N. R.
London, England.

War Revives Interurban.

THE war has restored several local trolley routes, but the only true interurban so revived, to my knowledge, is the main line of the Niagara, St. Catharine's & Toronto, extending 13 miles from St. Catharine's to Niagara Falls, Ont.

Buses were substituted for trolleys on this line, though the single track was maintained for the heavy freight service. The Welland Subdivision, from Thorold to Port Colborne, remained electric, due largely to the absence of a paralleling highway. Suburban service north to Port Dalhousie also remained.

Passenger service on the main was restored November 15. The heavy, well rebuilt interurbans run again, clipping several minutes from the schedules. Comfortable individual seats replace standing room in undersized, overloaded buses.

This interurban system is well worth a ride, and the company's attitude toward railfans is definitely friendly. There are the main line (13 miles), the Welland line (18 miles), and the suburban line to Dalhousie (6 miles). Local-line fans will find well maintained Cincinnatis both in St. Catharine's and Niagara Falls. The yard in St. Catharine's is filled with cars from all over the continent, from arch-window heavy wooden interurbans to long express motors.

Bill Kessel.
92 E. Depew Ave., Buffalo, N. Y.

Notes on Colorado.

LAST Spring I made the "circle tour" as described in TRAINS, as closely as I could, and enjoyed it very much. I am glad to report that the Rio Grand Southern is getting more prosperous as time passes. When I went through Antonito one could see the Chili line in the form of great piles of narrow-gauge rails and crossties. It was small satisfaction to learn that the powers-that-be regretted that the line had been pulled up when they found that a huge deposit of mica near the road is now in great demand.

Incidentally, I heard the D&RGW's narrow-gauge outside-frame Mikes referred to only as "mudhens" instead of "sports models." They are nevertheless good engines, though too heavy for the 45-pound rail on RGS sidings, so they hold the main line while the "Gallopin' Geese" duck into the sidings.

Herbert Gaarder Jr.
8212 S. May St., Chicago, Ill.

New 4-8-4 on Nashville, Chattanooga & St. Louis.

I HAVEN'T seen any mention of the 10 new 4-8-4's received last August from Alco by the Nashville, Chattanooga & St. Louis, so I'm enclosing a photo of one on the northbound *Dixie Flyer* at Cowan, Tenn. Numbers run from 570 to 579. Color scheme is black with yellow trim. The engines are used in both freight and passenger service between Nashville and Chattanooga. The road's other five 4-8-4's (Nos. 565 to 569) are now regularly assigned to the Chattanooga-Altanta Division.

Cpl. Robert W. Richardson.
Hqrs. Co., 95 Signal Bn., Camp Forrest, Tenn.

New York: Rail Center.

NEW YORK has so many angles to rail transportation that they are amazing even to native New Yorkers, who are supposed to amaze somewhat less easily than many other Americans.

Rail tunnels, car floats (float bridges, as they say in rail routings), open floats and closed floats for both bulk and package freight; bridges over Jersey rivers; piers, coal docks, ferry docks for passenger and automobile ferries. Miles of freight yards of all shapes, sizes and kinds. Tunnels under the Bergen Hills; "juice," Diesel and steam power; commuter trains, varnish trains. About the only lack I can think of, offhand, is a cog railway.

There must be many railfans who do not know that the B&O and the Lehigh Valley, also Erie, actually have tracks, locomotives, and freight stations in the heart of New York City. Along with Diesels, the B&O has a tank switcher which looks like the one in TRAINS of September, 1941.

Of course several other railroads have freight stations in the city, although no motive power and tracks: Central Vermont, Delaware, Lackawanna & Western, New York, Susquehanna & Western, Central of New Jersey, Reading, etc.

Then there is the New York Central's elevated freight line from 30th Street to St. John's Park, maybe two or three miles south, running through many buildings, with private sidings in the second story.

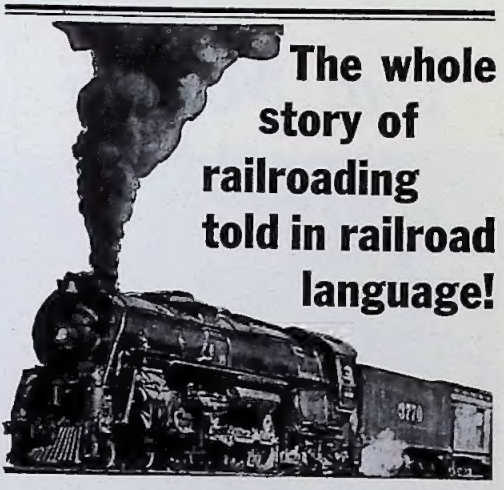
For the sightseer as well as railfan, the ferry trip from Manhattan to Jersey City via Central of Jersey (5 cents, passengers; 25 cents, car and passengers) is very worthwhile. In the Jersey yards a variety of equipment can be seen: B&O, Reading, and CNJ motive power as well as passenger and freight cars.

For the short-line fan there is Bush Dock Railway and Hoboken Manufacturers. The latter, incidentally, switches for Seatrain, which takes box cars (100 of them) to Texas, New Orleans and Havana (only government freight now).

As the railroads can hide neither their lights nor cargoes under a bushel, many things can be seen which for the duration cannot be mentioned.

D. K. Graham.

295 W. 11th St., New York, N.Y.



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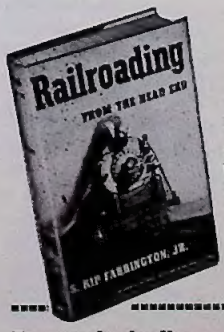

By S. Kip Farrington, Jr.

Introduction by Colonel J. A. Appleton, Chief of the Transportation Corps, Rail Division.

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The Month

★ Expect oil shipments to reach 900,000 barrels a day.

★ It is expected that this month all-rail oil movement figures to the East Coast area will average well over 900,000 barrels daily and that by Fall the figure will be increased to approximately one million. The latter figure is dependent, in part, on the number of new locomotives delivered, 600 now estimated as marked for delivery with a probable three to four hundred more on the way as a result of unfilled orders for 1942. New methods to increase oil-by-rail shipments are now well under way. A 39-car train of box cars loaded with oil-filled metal drums recently arrived in Boston. By using this method on a large scale an additional 20,000 barrels of oil can be delivered daily to the East Coast region. Pipe-line deliveries to Midwest oil-loading centers now total 160,000 barrels per day and a new line from Texas to Norris City, Ill., is delivering 130,000 barrels. This newest pipe line allows an increased 43,000 barrels daily to be shipped by rail, for it releases tank cars formerly used on long round trips to Southern oil fields. Work is to start this month on another pipe line from Texas to the Midwest rail-loading centers. Completion is planned for the line by Fall providing lack of material does not interfere with construction. It is expected that an additional 100,000 barrels daily can be shipped by rail when the pipe line reaches peak delivery to Midwest gateways.

★ The *Empire State Express*, all-reserved-seat streamliner of the NYC, has, in normal consist, 622 revenue seats. A plan whereby all intermediate stops are notified of space available has met with marked success. Records of 60 trips (holiday runs not included) show that the *Express* carried 60,882 passengers, 26,804 eastbound and 34,078 westbound, for an average of 1015 passengers per trip or 1.63 passengers per revenue seat.

★ Major General Charles P. Goss, chief of the Army Transportation Corps, states that 1,750,000 troops are being moved monthly by the railroads. This figure does not include those soldiers traveling as individuals on furlough or under orders, nor those in military groups of less than 50.

★ Officers of the United States Transport Corps and other railway men serving in England are assured of a bit of more-than-usual welcome when in London. The London Transport Board and the four British railways have opened a club for all men who acted in any capacity in the American transportation field. The club's purpose is to provide a common meeting ground for British and American transport men. Membership application forms may be obtained before sailing from Oliver Turner, Associated British and Irish Railroads, 9 Rockefeller Plaza, New York City. The address of the Transportation Club, the name officially given it at opening ceremonies on January 1, is Wilton Crescent, London, S. W. 1, England.

★ Architect Whitney Warren, designer of the Grand Central Terminal group of buildings in New York, died January 24 at the age of 78. Mr. Warren, since his resignation from the firm of Warren & Wetmore in 1931, had been a consulting engineer in New York.

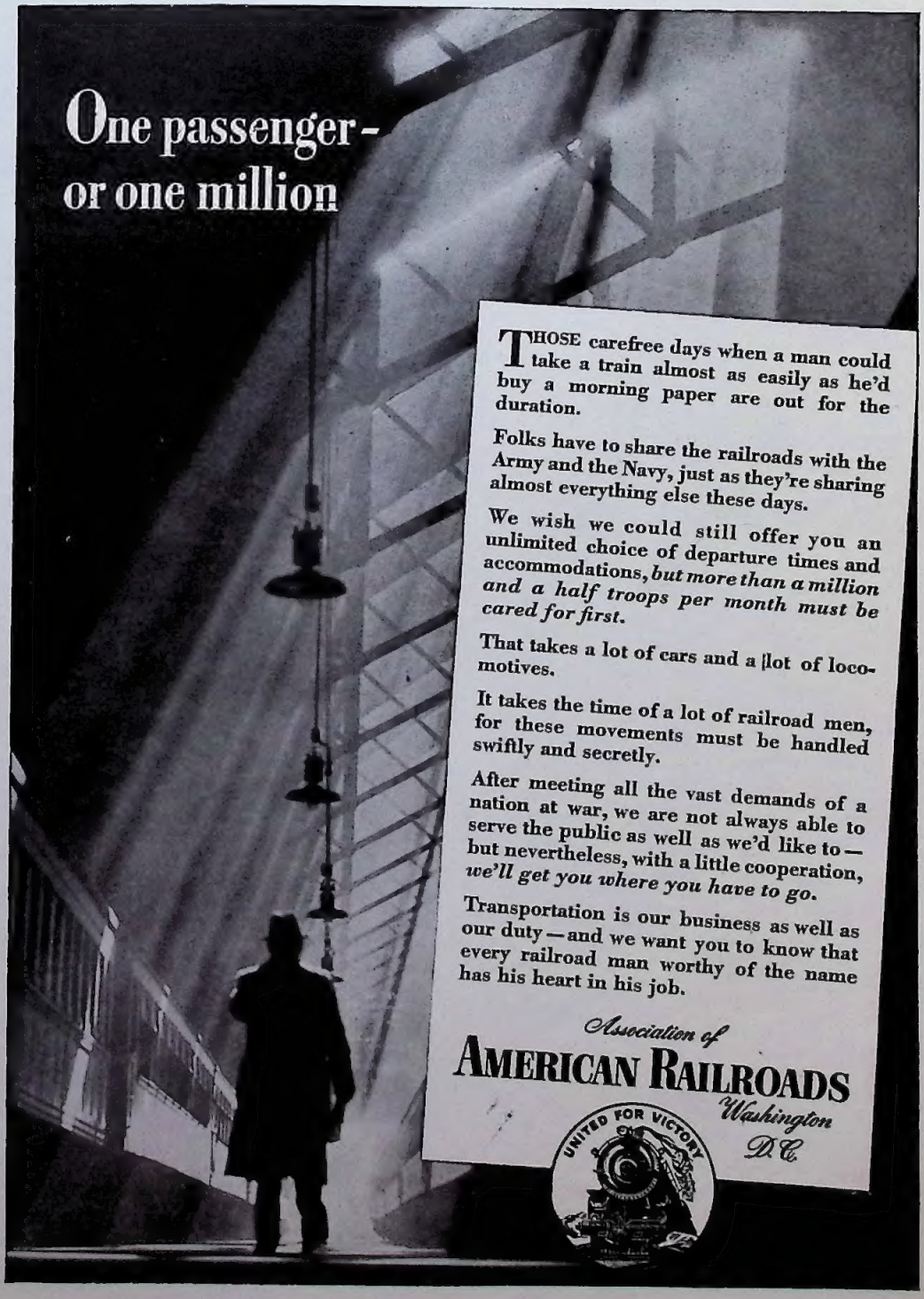
★ While accurate figures are not yet available, it has been conservatively estimated that more than 8000 miles of trackage was constructed for all types of defense projects during 1942. Though the fact has been little publicized, the railroads furnished nearly all the rail used from stocks they already had on hand.

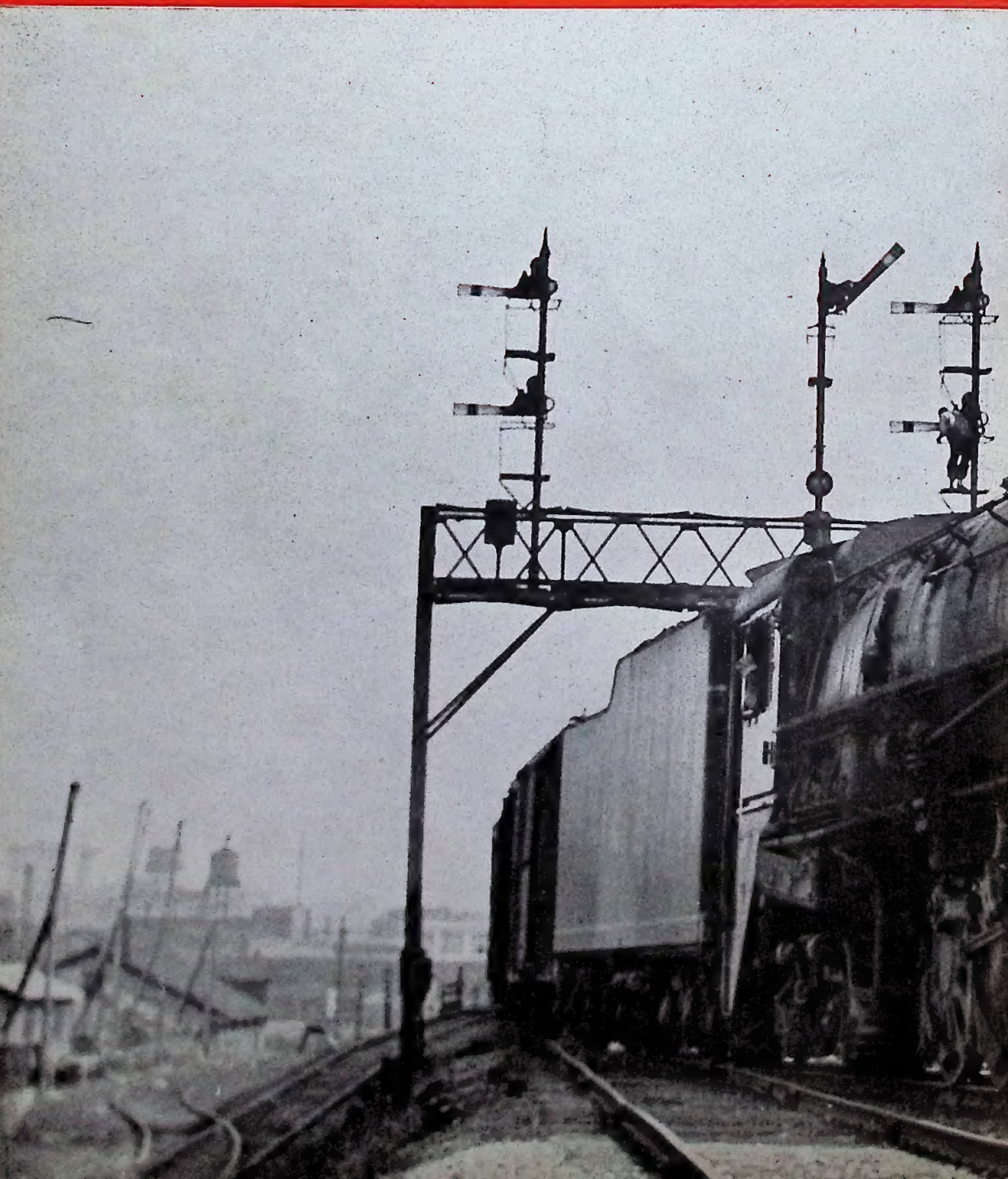
★ More than 700 locomotives have been leased by railroads having a surplus of motive power to other roads lacking it. At the close of the Great Lakes navigation season, the Duluth, Missabe & Iron Range leased four to Denver & Rio Grande Western, four to Great Northern, seven to Southern Pacific, and three to Western Pacific. The DM&IR also had two of its new locomotives delivered to the D&RGW for use until this month. It is expected that all DM&IR equipment will be returned this month for the beginning of the iron-ore movement. The largest number of locomotives leased by one road totaled 108 and these, from the Chicago & North Western, are now serving the Atlantic Coast Line, Southern, Kansas City Southern, Missouri Pacific, and the Seaboard. A few C&NW locomotives were sold to the Mexican government. The lease program, resulting from cooperation between the railroads, the O. D. T. and the A. A. R., was somewhat limited in scope due to load limit rules, clearance limitations and signal equipment.

★ New mainline trackage placed in service by the railroads in 1942 aggregated 74 miles, an increase of 37 per cent over 1941. Relocation of 30 miles of track by the Southern Pacific, from the area of the pool back of Shasta Dam, was the largest new mainline construction for the year.

★ The Illinois Terminal Railroad lines in Illinois will not be abandoned, according to an action taken recently. Request was made by the railroad to the I. C. C. to postpone indefinitely its consideration of the Terminal's petition to abandon the lines between Danville and Mackinaw Junction via Decatur. A. P. Titus, president, stated that the request to abandon was made because of the urgent need of scrap, but that now the rubber situation has become so serious it would be unreasonable to stop operations. In October, 1942, the W. P. B. requisitioned the line but action was stayed by an injunction obtained by the Illinois Commerce Commission.

"RIGHT OF WAY FOR THE U. S. A."



Trains

Milwaukee Road 222, a 4-8-4, crosses from freight track to passenger track at Milwaukee with a Chicago-bound freight. Notice maintenance man on signal bridge.—*Henry J. McCord, 112 N. Washington St., Batavia, Ill.*